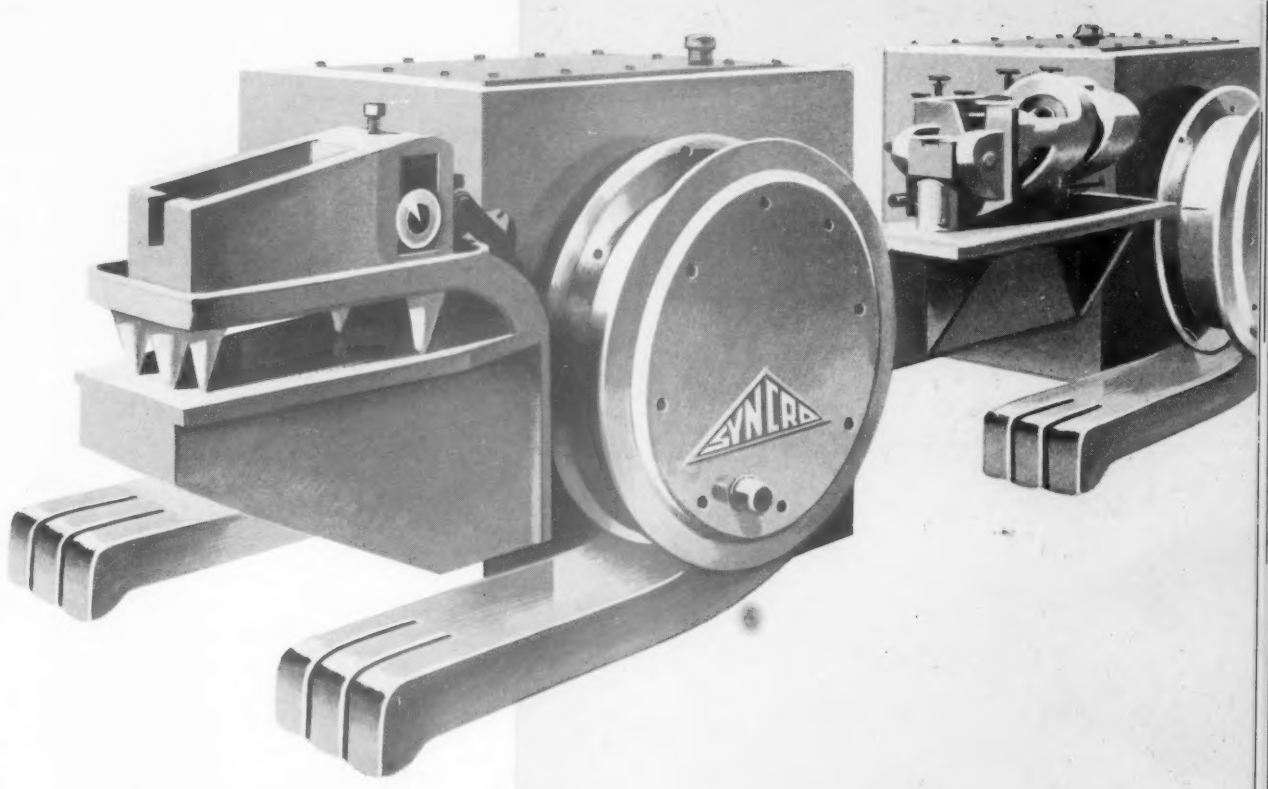
FEBRUARY 1958

WIRE AND WIRE PRODUCTS



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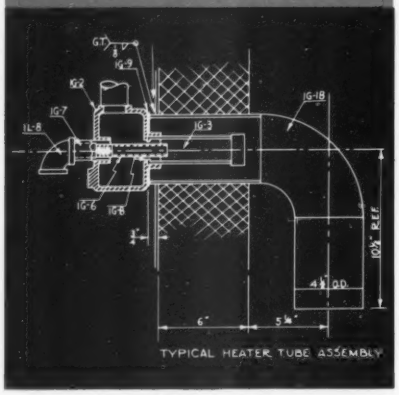
Better Machinery for the Wire Industry

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

One of three radiant heated galvanizing settings at this plant.

Pot size—16′ x 4′ x 3′ deep.
30 strands—12-20 gauge.
Number of burners—18 per side.



LEE WILSON Wire Galvanizing Lines at Colorado Fuel and Iron's Pueblo Plant

Here is the way to heat galvanizing pots with accurate control response, drossage cut in half, and pot life doubled. Combustion is completed in the alloy elbow so there is no flame impingement on pot walls, and with radiant transfer of heat, there are no overheated areas to cause boiling of dross. » Our specialist on galvanizing processes can help you improve this operation in your plant. Call on us for an immediate analysis and recommendations.

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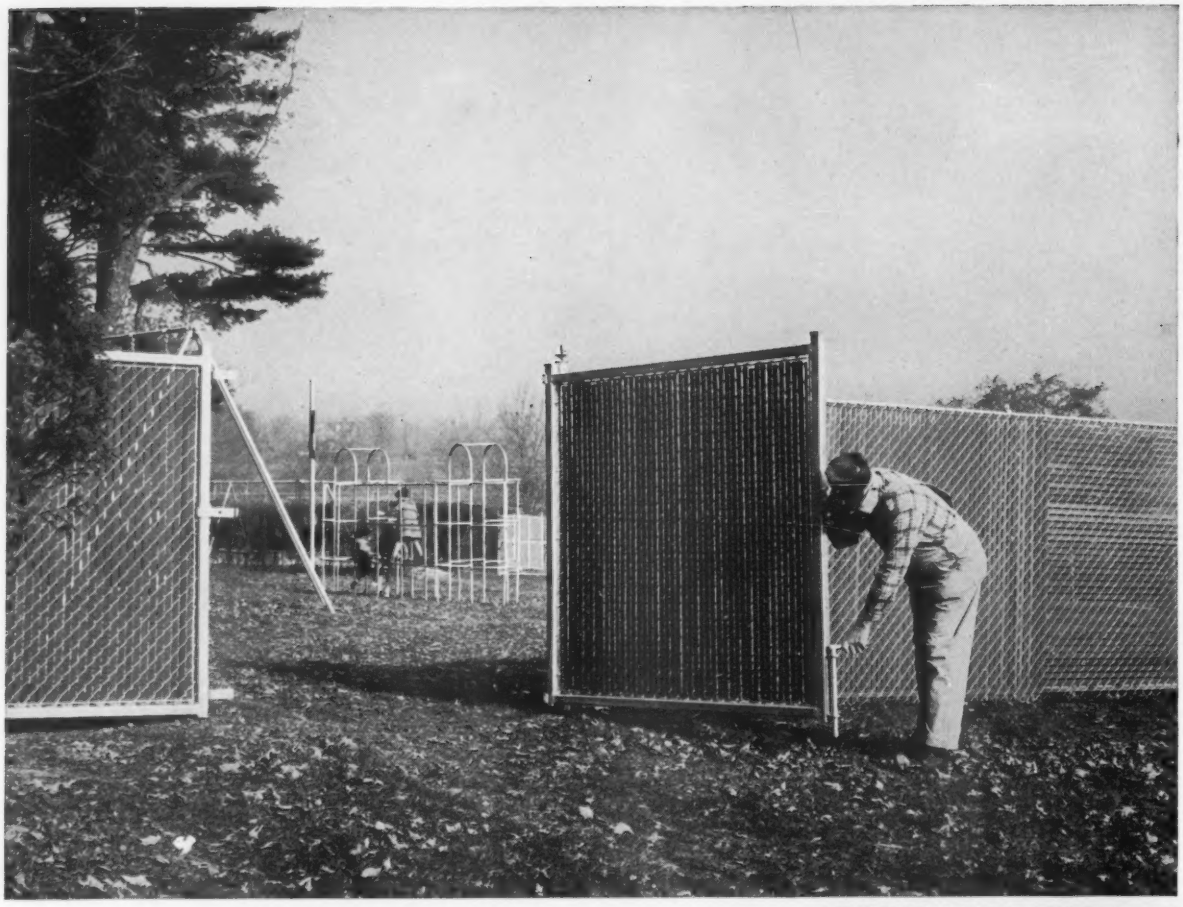

NO PEEKING
Through This Chain-Link Fence!

Usually chain-link fence is used to provide protection. Yet here's an installation where it affords a measure of privacy too.

The secret lies in the thin slats which are laced through the links of the fence. The slats may run vertically, horizontally or diagonally to achieve a variety of design effects. This interesting use of chain-link fence is a development of the Anchor Fence Division of Anchor Post Products, Inc., Baltimore, Md., to whom Bethlehem has been supplying steel wire for many years.

Bethlehem makes just about every kind of steel wire. And a big part of our job is working closely with wire users, developing the best type of wire for each different application.

Whether you need one of our special-purpose wires or one of the more ordinary types, you can count on our modern wire mills to do the kind of job that will keep your steel wire problems to a minimum. We'll be glad to have a Bethlehem man give you prices, delivery, and other details. Just phone our nearest sales office.

Young pupils at the new Rolling Road School, Catonsville, Md., enjoy their play periods behind this chain-link fence made and erected by the Anchor Fence Division of Anchor Post Products, Inc., Baltimore, Md.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor,* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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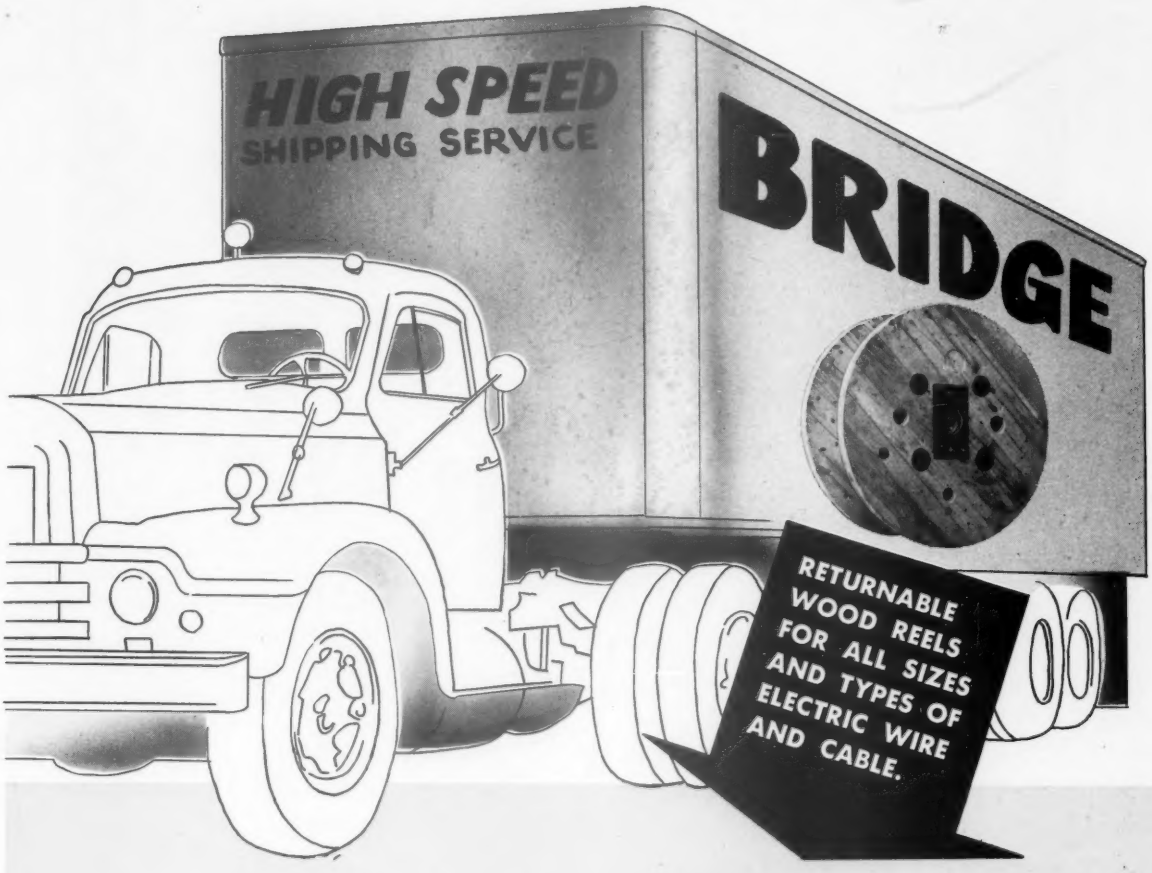

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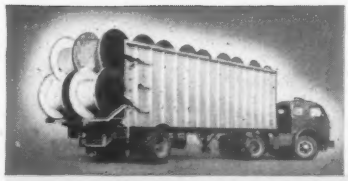

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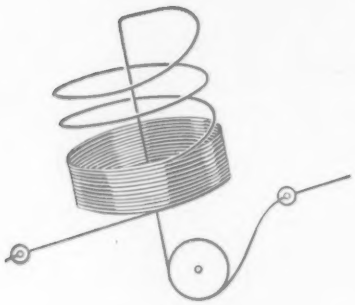

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Ask about it.

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W.M.-85

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 33 February, 1958 No. 2

Designated as Official Publication By The Wire Association

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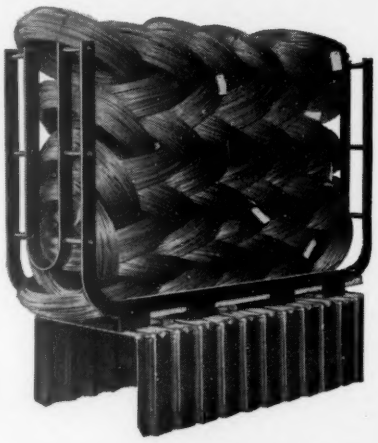
NEW IDEA

IN WIRE HANDLING

- **Saves Floor Space**
- **Reduces Costs**
- **Frees Cluttered Aisles**



Republic's new Stack 'N Store Units provide a practical and economical solution to the problem of wire handling.

The units are especially adaptable to bulk material, such as coiled wire, that does not require the use of completely enclosed sides. Specially designed "U" shaped superstructure permits high stacking of coiled wire.

Fully loaded superstructures are handled quickly and easily by crane. Or superstructures may be placed on skids and the entire unit readily moved to a storage area by lift truck.

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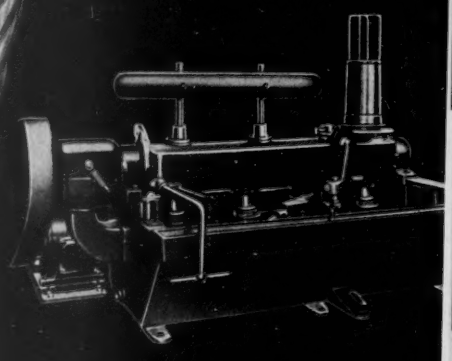

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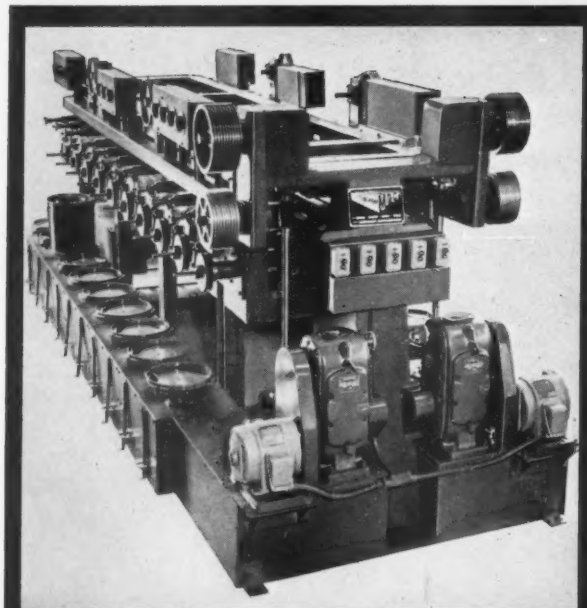
NEW

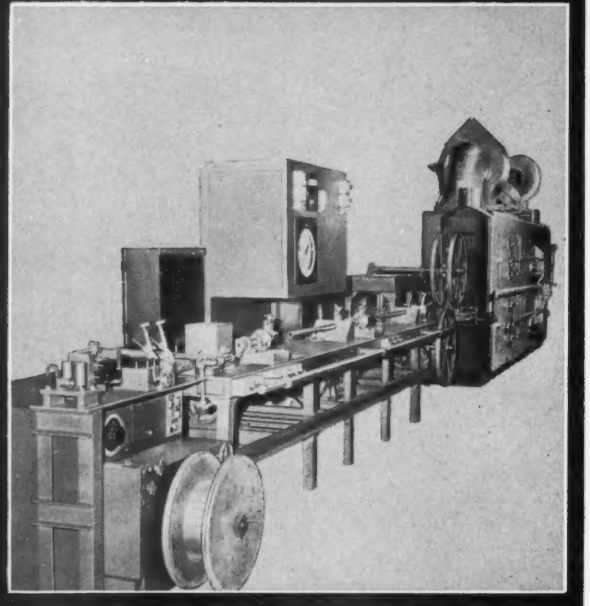


New Reel-R-Drum Packer handles two wire sizes simultaneously at different speeds through the same process.

MOCO's new Reel-R-Drum Packer is setting production records in forward-looking companies. This versatile unit has a speed range from 20 to 120 feet per minute. You can produce two wire sizes simultaneously through the same process at different speeds. Handling wire sizes ranging from .0089" to .025" in diameter, this MOCO Reel-R-Drum packages annealed copper magnet wire on different reels or in nominal 100 lb. capacity Payoffpak Drums, or both simultaneously. This versatile unit is built for tandem operation with a high speed MOCO type "C" wire enameling machine.

New MOCO Machine applies 2 servings of glass or yarn and 4 coats of baked insulating varnish

Satisfied users acclaim this new insulating, impregnating and varnish baking machine as a completely revolutionary development in the field of wire enameling. It is capable of turning out large quantities of heavy rounds and rectangulars (up to 150 M. Sq. Mls. Cross Sectional Area), baking on 4 coats of insulating varnish and applying two servings of glass or textile yarns . . . simultaneously! MOCO's revolutionary Rapid-Cool Oven lets you stop production without damage to wire in the oven. Return to full production in a matter of seconds because of the rapid rise of the temperature inside this MOCO Tunnel Oven.



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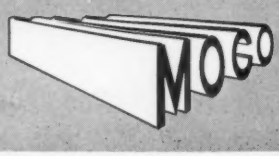

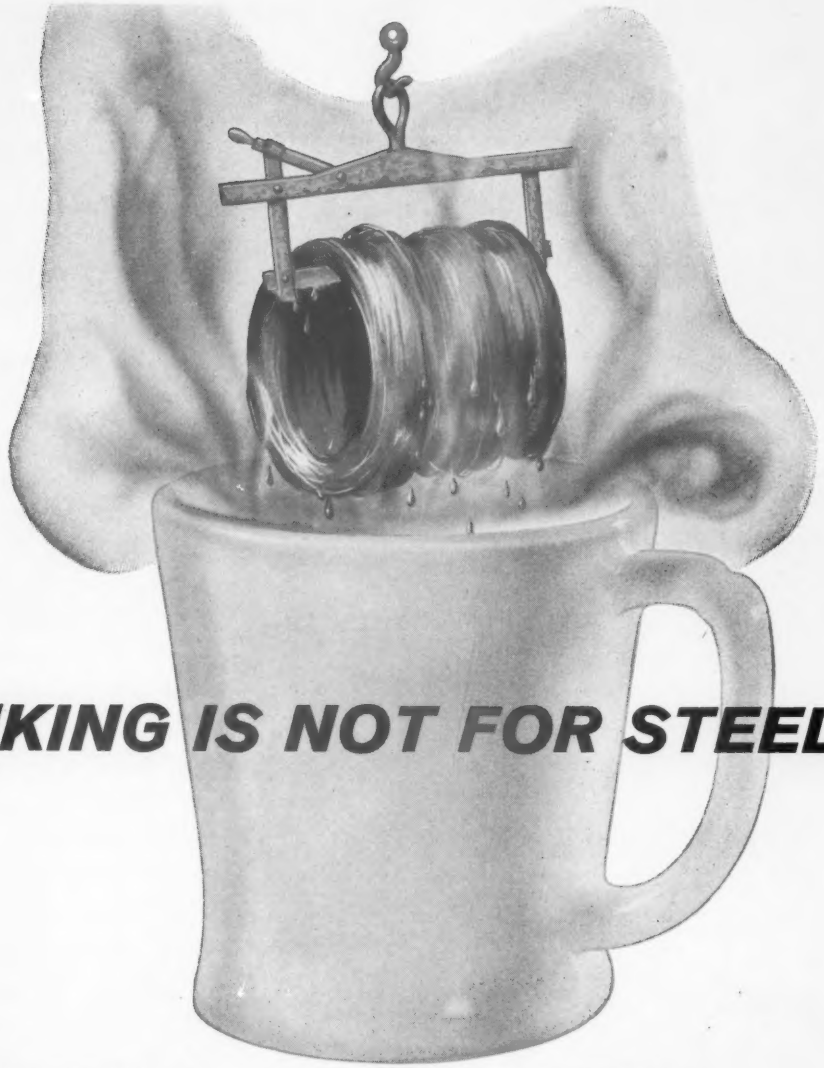

DUNKING IS NOT FOR STEEL ROD

Wheelabrator® abrasive blast descaling automates wire drawing and processing lines

Through application of Wheelabrator blast descaling, it is now possible to clean, coat, draw, and cold head in one continuous operation and secure the following advantages:

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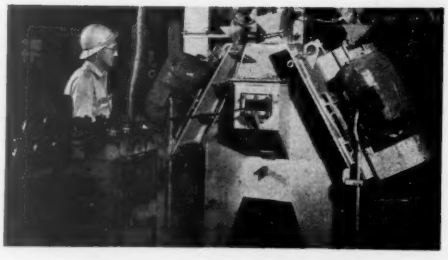
- **Superior finish for coating and die lubrication**
- **Elimination of multiple handling of hot rolled coils**



These cost-cutting Wheelabrator advantages are already being obtained by prominent producers of wire products in descaling various size rod at speeds up to 600 f.p.m. New applications in the wire products field are constantly being developed. It will pay you to investigate the Wheelabrator for your cleaning problems. Write today for complete information.

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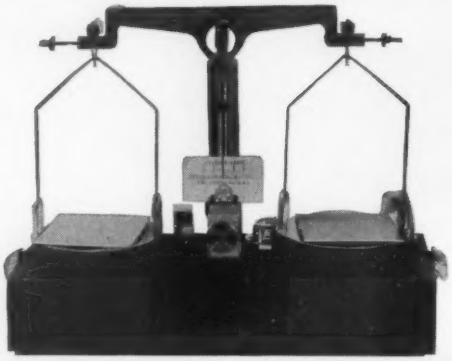
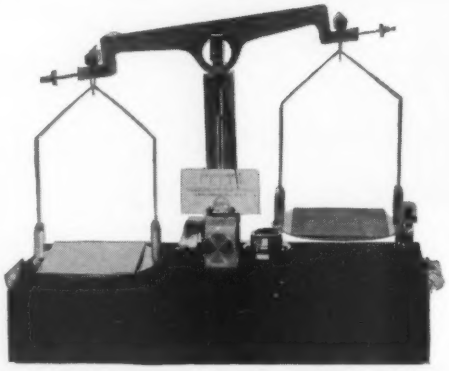


NO WEIGHT DIFFERENCE. Two identical panels of low-carbon sheet steel were used. They balanced the scale.

RODINE MINIMIZES ACID ATTACK. Each panel was placed in a beaker containing 10% by volume of 66° Bé sulfuric acid at 160°F. The acid in the right-hand beaker was uninhibited. The acid in the left-hand beaker was inhibited with Rodine 82, ¼% by volume of the concentrated acid. There was little or no hydrogen evolution in this beaker . . . Rodine retarded the attack of the acid on the base metal.



RODINE SAVES METAL. Both panels were removed from the acid pickle solutions after 5 minutes. The one pickled in the uninhibited acid had lost 1.4% of its original weight. The one pickled in the Rodine-inhibited acid had lost only 0.001%. This represents a saving of 26 lb. of steel for each ton pickled; and a simultaneous saving of nearly 50 lb. of 66° Bé sulfuric acid when Rodine is used to inhibit the acid.

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With ACP Rodine as the pickling acid inhibitor, you use less acid and have more steel to sell. Up to 50 lb. of acid is saved per ton of steel pickled and up to 26 lb. of steel. Fuming is practically eliminated. Formation of blisters and embrittlement is minimized. Costs of charging and cleaning of pickle baths are reduced—baths can be operated longer, and less acid is required to keep them at desired concentration. There are fewer rejects—steel pickled in acid inhibited with Rodine has uniformly clean, bright surfaces, free of pits, blisters and smut.

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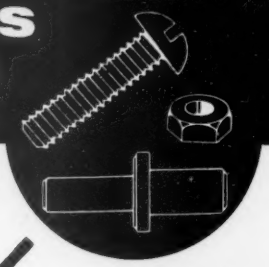

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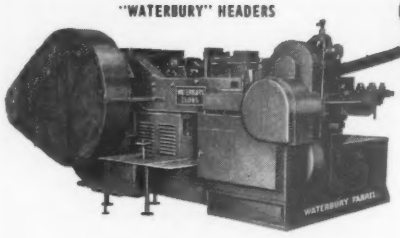

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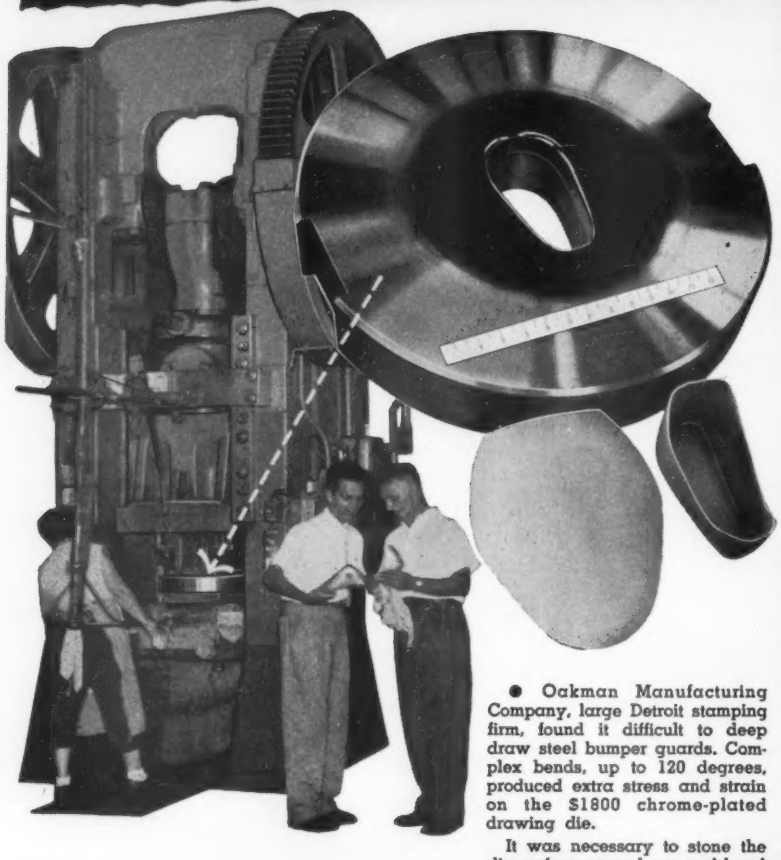

● Oakman Manufacturing Company, large Detroit stamping firm, found it difficult to deep draw steel bumper guards. Complex bends, up to 120 degrees, produced extra stress and strain on the $1800 chrome-plated drawing die.

It was necessary to stone the die surface every hour, and hand polish entire drawing surface after each day's run. The steel die had to be completely reworked and a new chrome-plated surface added after drawing 60,000 parts. Downtime for maintenance made it difficult to maintain production schedules. Maintenance costs soared.

A Grade C-80 Talide die ($2700) was installed 8 months ago. To date it has drawn over 800,000 guards with no wear in evidence. Downtime for die maintenance has been greatly reduced. A buffing operation (25c per piece), previously required, has been entirely eliminated because of the smoother, brighter, more durable finish achieved with the Talide die.

A Talide die engineer can help you cut costs and increase production on draw presses, punch presses, pill presses, cold headers, swagers and draw benches. METAL CARBIDES CORPORATION, 6001 SOUTHERN BLVD., YOUNGSTOWN 12, OHIO.

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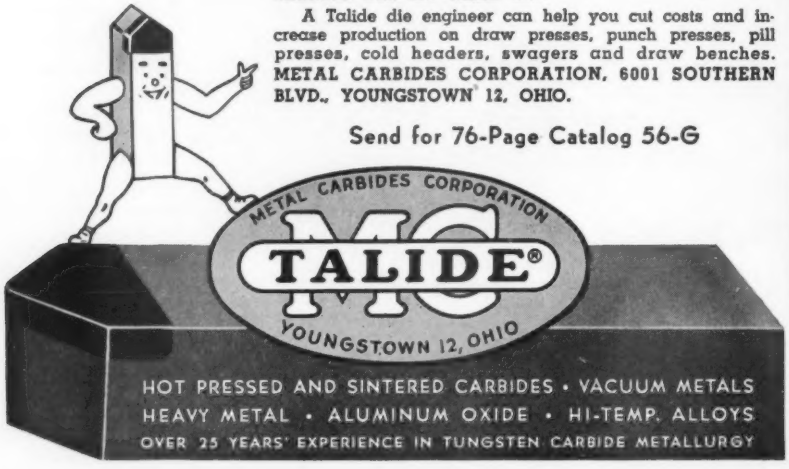
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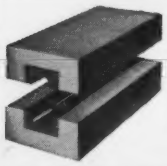
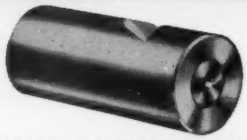


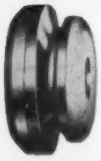
SWAGING DIES

Leading Fountain Pen Manufacturer cold swages 33 times more stainless steel parts with TALIDE dies.



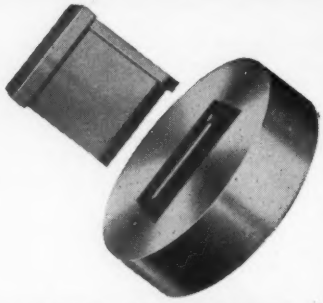
HEADING AND EXTRUSION DIES

Cold heading ¼" C-1008 rivets, TALIDE dies produced 11,200,000 pieces, other carbide dies only 3,500,000.



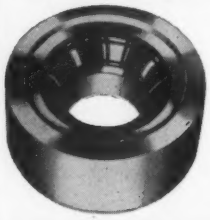
CURLING ROLLERS

TALIDE Curling Rolls last 65 times longer than steel rolls on beverage can forming operation.



BLANKING AND FORMING DIES

70 times more paper discs blanked out with TALIDE—over hard alloy die.

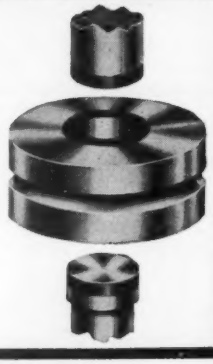


SHEET METAL DIES

137,000 hi-alloy steel pressure vessels drawn with TALIDE against only 7,900 with steel dies previously used.

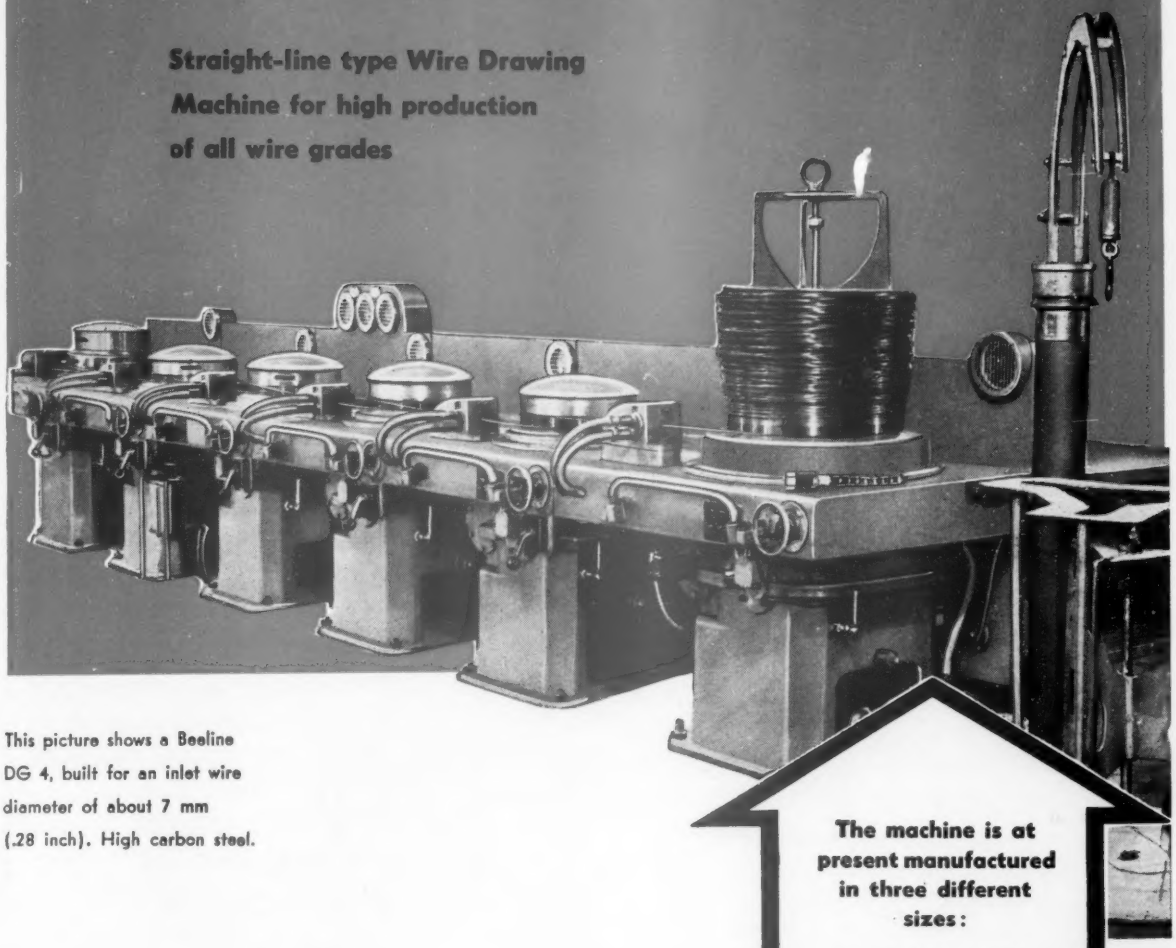
POWDERED METALLURGY DIES

Compacting highly abrasive chemical powders, TALIDE pill dies last 4 months, steel dies wore out in 6 hours.



THE BEELINE WIRE DRAWING MACHINE

Straight-line type Wire Drawing Machine for high production of all wire grades



This picture shows a Beeline DG 4, built for an inlet wire diameter of about 7 mm (.28 inch). High carbon steel.

Prominent Beeline features:

- Complete absence of slipping between wire and block.
- Direct block-to-block wire running, with automatic speed control and no loops or other mechanical adjusting devices.
- Continuous speed adjustment from almost zero up to maximum.

Let us help you solve your problems. We shall be glad to answer your questions promptly. Don't forget to let us know what wire is to be drawn, the inlet and finished diameter, its intended use, the production required, and all other relevant information (tensile strength of the finished wire etc.). Then we can suggest a machine that is just right for you.

The machine is at present manufactured in three different sizes:

BEELINE DG 5

for heavy wire, about 13 mm. (.500 inch)

BEELINE DG 4

for wire rods, about 7 mm. (.28 inch)

BEELINE DM 3

for wire with an inlet diawire of about 3 mm. (.116 inch)

MORGÅRDSHAMMAR

MORGÅRDSHAMMARS MEK. VERKSTADS AB • MORGÅRDSHAMMAR • SWEDEN

Cables: Morgårdshammar, Ludvika. Tele: 0240–71100

Sales Representative:

AB Nickels & Todsen, Stockholm 16, Sweden

Cable address: Nickelto, Stockholm

NOW! at low cost twist any number of conductors to make cable up to 1" diameter

only the COOK MULTIPLE INSULATED WIRE TWISTER provides such flexibility

Here's a twister that offers the flexibility required of todays wire mills manufacturing insulated cables. It's truly flexible —you can make any cables required up to 1" diameter.

And, because the COOK MULTIPLE INSULATED WIRE TWISTER is so low cost, it is the practical addition to your plant. Compare it with any other machine on the market doing this work . . . compare its performance . . . compare its cost . . . compare its construction. Why not see for yourself . . . write for complete specifications and prices today.

SPECIFICATIONS

Production	9,000 ft/hr at 7½" lay
Reel Size	30" std. also from 16-36" dia.
Floor Space	6 ft. x 8 ft. max.
Lay Range	¾" to 7½"
Twist	Right or left hand
Finished Wire Size	Up to 1" dia.
Wrapping Head	Optional
Neutralizer	Optional

COOK

MANUFACTURING CO.

50 EAST 25th STREET, PATERSON, N. J. • ARMORY 4-6380

•

CANADIAN AGENT:
E. V. LARSON CO., LTD., TORONTO, CANADA

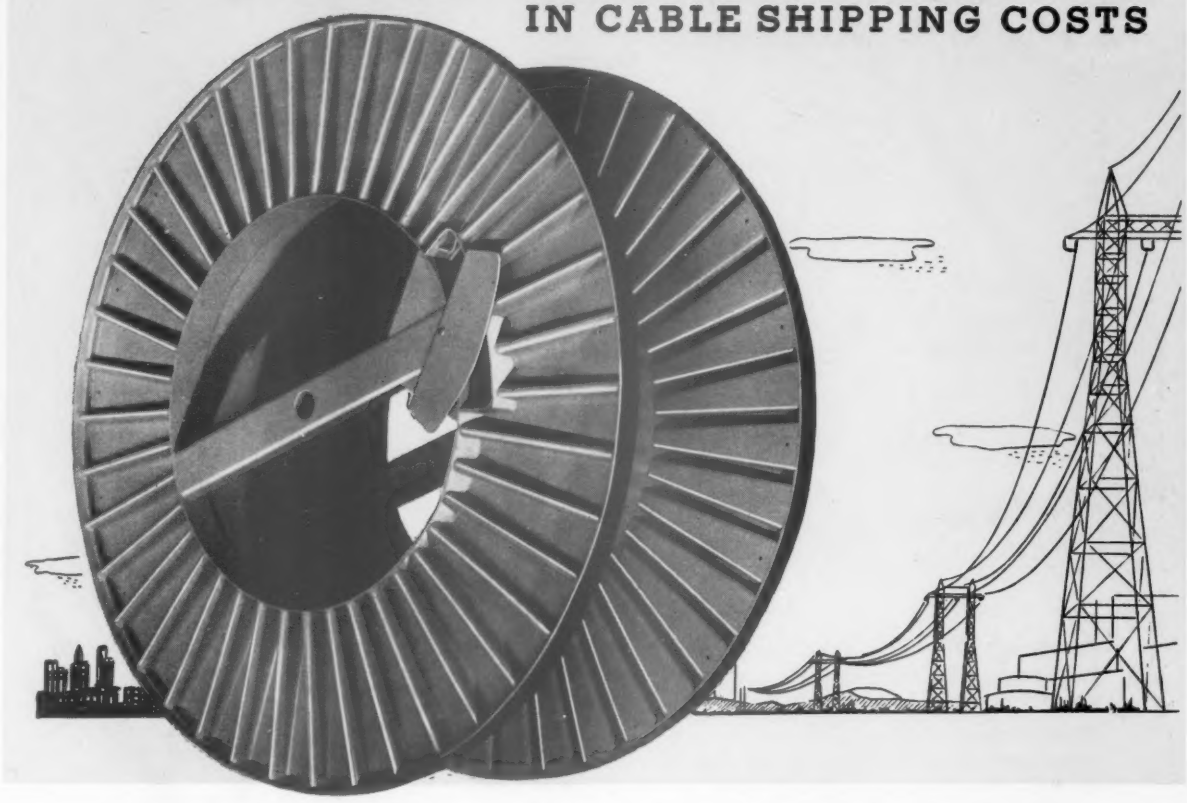
•

EUROPEAN AGENT:
CAPAMADJIAN LE MONNIER CIE LTD., PARIS, FRANCE

20-YEAR RECORD REVEALS

GREAT REDUCTION

IN CABLE SHIPPING COSTS



EVANS LIGHT WEIGHT

TOROIDAL METAL REELS

25% AVERAGE WEIGHT SAVINGS PER REEL

Toroidal design helps cut weight and freight costs to a minimum. Permits easier, faster, lower cost handling.

OUTLASTS 5 WOOD REELS

Evans metal reels have a proven service life of 20 reel trips. Many thousands of these reels have *lasted over 50 trips.*

CUTS MAINTENANCE COSTS

Cost records show Evans reels effect a 50% savings over wood . . . when Evans special repair kit is employed.

For more complete information write to Chicago Sales Office: 208 South LaSalle Street.

THE GEORGE EVANS CORPORATION

MOLINE, ILLINOIS

With

NOPCO® KLY

a liquid fine wire drawing lubricant

Be sure to try Nopco KLY next time you're drawing fine size steel or fine and intermediate size copper wire. It's *different*—and everything different about it you'll find is a big advantage.

First, this emulsifiable oil mixes quickly and completely with water—hot or cold. This feature alone is enough to make it ace-high with you. But it has other advantages equally important.

Your bath lasts longer. Nopco KLY has a built-in affinity for water. Its lubricants stay *uniformly active* much longer, since the "drag out" of the lubricants from the solution is reduced beyond anything you've ever seen.

Prevents Formation of Insoluble Copper and Lime Soaps—both the copper soaps, which score dies, clog feed lines and screens; and the lime soaps you've been bothered with when drawing lime coated steel wire.

KLY may be used for high carbon, low carbon, limed, galvanized, and liquor finished fine steel wire—also for fine and intermediate copper, bronze, and brass wire. You'll surely want to try this die-saving, cost-saving lubricant soon. Write today for free booklet "Nopco KLY", which gives full instructions, lists percentages of fat in all emulsions.
Nopco Chemical Company,
Harrison, N. J.

YOU MIX IT FASTER, EASIER

YOUR BATH LASTS LONGER

YOU GET UNIFORMLY ACTIVE LUBRICATION

1907–1957 50 Years OF PROGRESS IN CHEMISTRY

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Canada

Sterling COMMERCIAL STEEL BALL CORPORATION

KEYSTONE XL WIRE STUDY

20% longer die life...

5% greater production of steel balls

FROM KEYSTONE XL WIRE *flowability* IS THE SECRET

That's right... 20% longer die life and 5% greater production... and all because of Keystone "XL" Wire's exceptional flowability.

This sums up the experience of Sterling Commercial Steel Ball Corporation, Sterling, Illinois. Sterling has cold headed steel balls by the millions – from ⅛ inch to ¾ inch in diameter – since production was initiated ten years ago. Sterling's steel balls are used primarily in conveyors, castors, office furniture, etc.

Officials of the company report that the superior forming characteristics of Keystone "XL" Wire are in evidence in the initial stage of steel ball production. The steel balls are upset on a single blow, solid die cold-header. With Keystone "XL" Wire flowability, the amount of "flash" left on the newly produced steel balls is small – a mark of quality heading wire. Case hardened steel balls – perfect in diameter – like those shown above, are standard, high-speed production items when Keystone "XL" Wire is used.

If you are having trouble cold heading parts which are complicated in design, or which demand trueness of form, talk it over with your Keystone representative. He can show you how the uniform high quality of Keystone "XL" Wire can fulfill your requirements. See him soon for complete details, or write direct.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Keystone Steel & Wire Company
Peoria 7, Illinois

Brand New... COLD HEADING FACTS FOLDER... send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

Name_____ Title_____

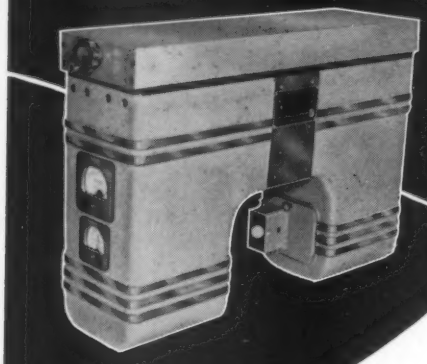
Company_____

Street_____

City_____ State_____

AUTOMATIC DIAMETER CONTROL

For Continuous Vulcanizer Lines



with the

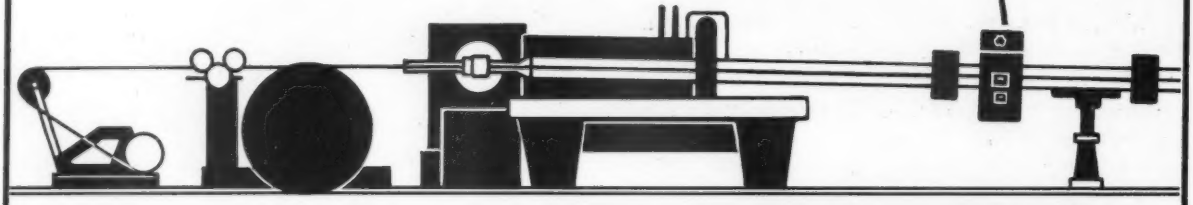
MICROLIMIT CONTROL CABLE GAUGE

Mounts on the vulcanizer tube within 10 feet of die

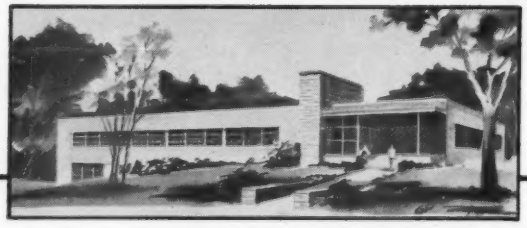
"Sees" cable diameter through windows fastened in tube

Provides continuous, non-contact measurement and automatic control of diameter from 0.100 to 4 inches

Completely field tested and approved!



For further information—

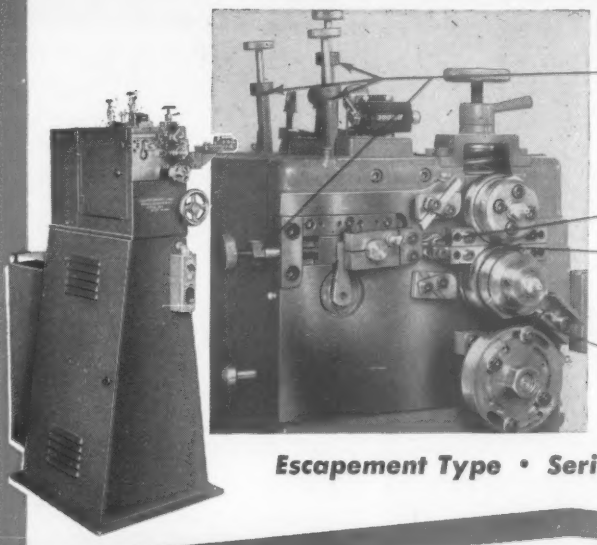


INDUSTRIAL GAUGES CORPORATION • WEST ENGLEWOOD, NEW JERSEY

SPRING MAKERS MACHINERY

A Complete Line . . . manufactured by

SLEEPER & HARTLEY



No. 0 UNIVERSAL SPRING COILER

Pitch and diameter controls designed for precision movement of the tools. Locking nuts bind on center of thread for positive adjustment while the machine is running.

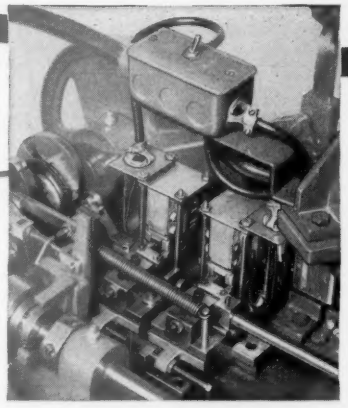
Separate Arbor Lock.

Continuously rotating, adjustable feed roll lifting cams for measuring wire feed accurately.

Escapement mechanism operates in neutral position while wire is being fed and traverses cam sleeve to start and stop wire feed.

Escapement Type • Series 720 • 73" Model

No. 0 TORSION SPRING MACHINE • *607 SERIES*



The Solenoids have a separate switch for gripping and releasing wire.

"ELECTRO-GRIP SLIDE FEED" with reciprocating cutter tube

Highly accurate wire feed is made possible by adjustment against positive stops.

The reciprocating cutter tube accurately guides wire to the arbor driving pin and holds wire during winding.

"AUTO-SPEED" CAMMING

The cams rotate seven times faster which allows more forming work during recoil, and reduces secondary operation costs.

SLEEPER & HARTLEY MAKES:

- Universal Spring Coiling Machines — Segment, Escapement and Clutch types — available with Torsion Tooling attachment
- Torsion Spring Machines
- Cable Armoring Machines
- Spring Hooking Machines
- Ring Coiling Machines
- Special Coiling Machines
- Straightening & Bundling Machines
- Straightening & Cutting Machines
- Flexible Casing Machines
- Flexible Tubing Machines
- Rolling Mill
- Key Ringing Machines
- Lock Washer Machines

SLEEPER & HARTLEY, INC. **BOX 1249, WORCESTER, MASS.**

ORIGINAL MANUFACTURERS OF UNIVERSAL SPRING COILERS

EST. 1911

Regional Die Center,
11177 E. 8 Mile Road, Detroit, Mich. —
headquarters for the
Metallurgical Products Department

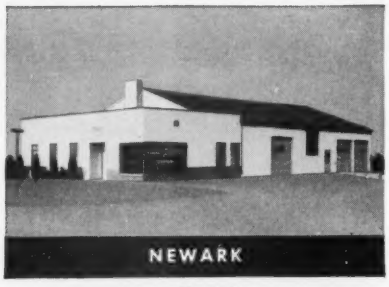
Regional Die Center,
704 Second Ave.,
Pittsburgh, Pennsylvania

Regional Die Center,
2106 W. Washington Blvd.,
Los Angeles, California

Wherever you're located . . .

Carboloy Die Agent
— Bronson & Bratton, Inc.,
5161 South Millard Avenue,
Chicago, Illinois

Carboloy Die Agent
— Allied Carbide Products, Inc.,
Hatboro, Pennsylvania



Eastern Metal Shop,
760 Colfax Ave.,
Kenilworth, New Jersey

you get fast delivery when you order Carboloy® die products

Carboloy Regional Die Centers and Die Agents now serve the wire industry from six strategic locations.

Standard Carboloy Dies and Die Products

You'll get speedy delivery from complete stocks in Chicago, Detroit, Los Angeles, Philadelphia, and Pittsburgh.

Fabricated Carbide Shapes

You'll get fast service on fabrication and finishing of special carbide shapes from Die Agents in Chicago and Philadelphia — and 4- to 6-day delivery on semi-standard and special shapes from the Eastern Metal Shop in Newark (Kenilworth), N.J.

Die Refinishing

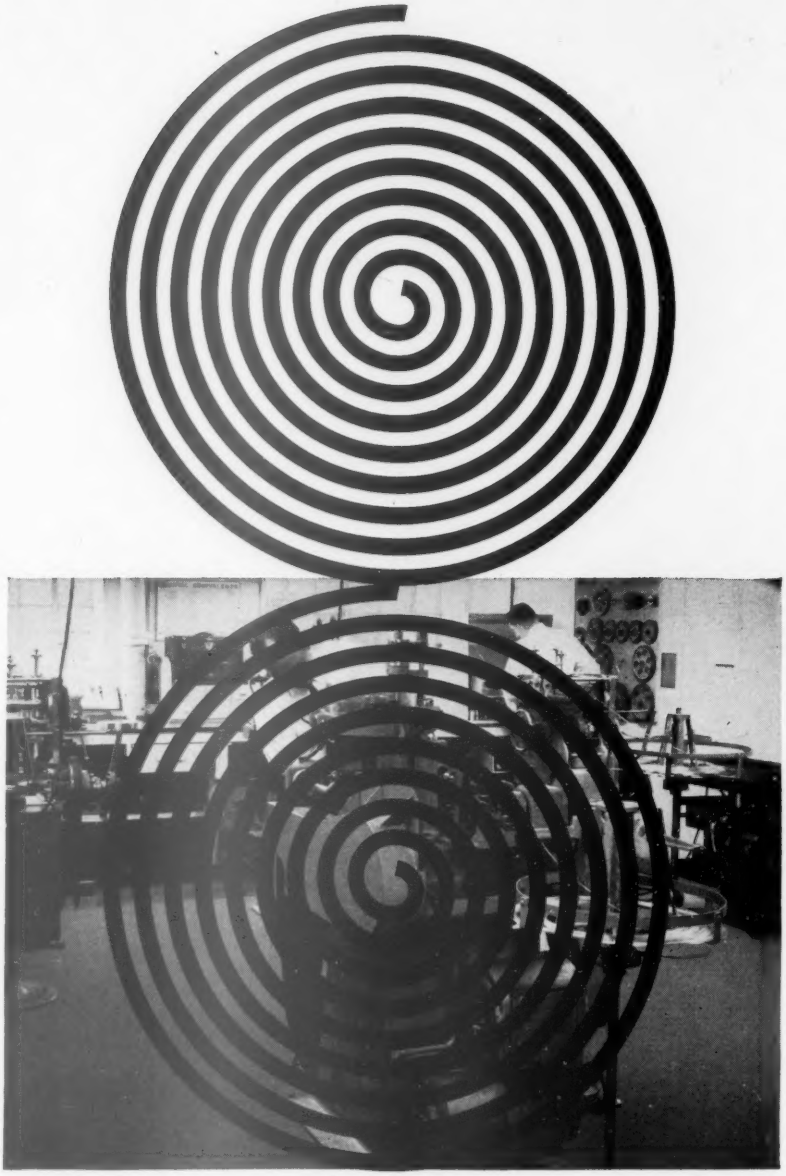
In addition, you can get complete die-refinishing service plus technical assistance in Detroit, Philadelphia, and Pittsburgh. For your copy of the new Carboloy Die Engineering Manual, write: *Metallurgical Products Department of General Electric Company, 11171 E. 8 Mile Ave., Detroit 32, Mich.*

CARBOLOY®
CEMENTED CARBIDES

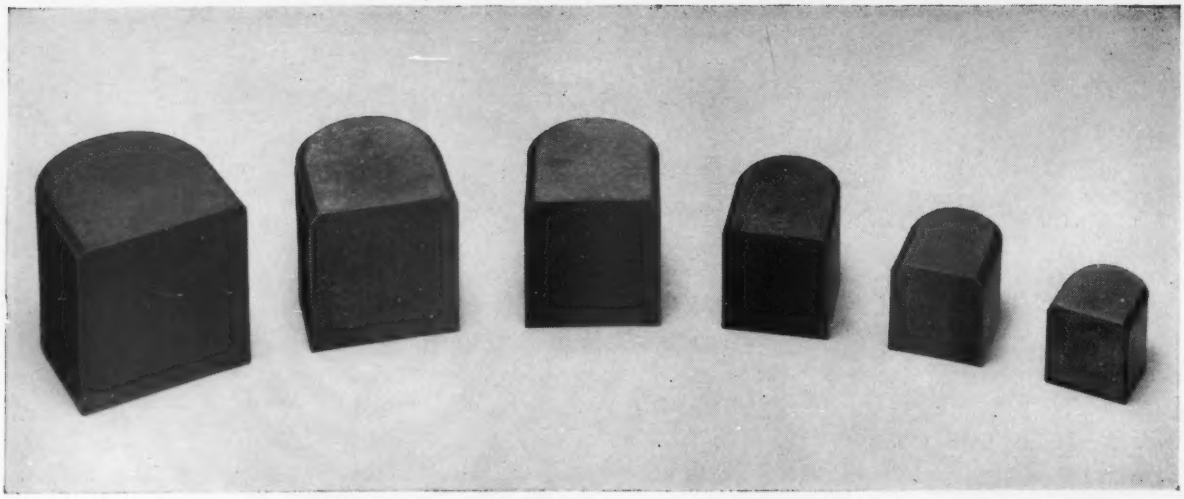
GENERAL ELECTRIC

SPRING CLINIC

Torrington leads the field in the development of the most advanced wire forming equipment available today. One of the reasons is Torrington's Wire Forming Laboratory, devoted exclusively to the professional springmaker's problems. This kind of close and constant study of our customers' needs has resulted in wire forming machinery tailored to meet the toughest requirements for versatile and economic production. If *you* have problems in coiling or costing, your inquiries will be classified CONFIDENTIAL!



THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT
VAN NUYS, CALIFORNIA · OAKVILLE, ONTARIO



Yes, we have Firthaloy Carbide NAIL DIE INSERTS

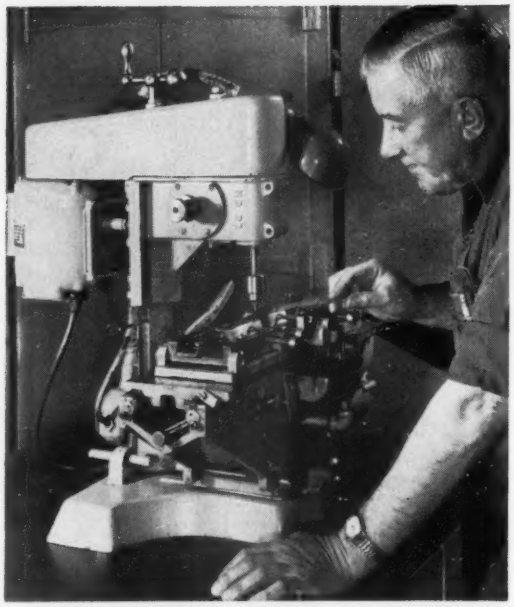
Firthaloy Nail and Tack Die inserts are available from warehouse and distributor stocks in 8 sizes covering the complete range of nail tooling needs. Standards NT-1 to NT-8, specifications for which are shown below, are furnished unground. Ground inserts or sizes or grades other than standard are furnished upon request, of course.

Firth Sterling pioneered the development of sintered carbides for nail and tack tooling. Firth Sterling also designed and developed the only nail die barbing machine available to industry. The combination of high production Firthaloy nibs and Firth Sterling tool room finishing equipment assures lowest die cost with maximum production.

SPECIFICATIONS

INSERT NUMBER	DIMENSIONS				GRAM WEIGHT
	T	W	L	R	
NT-1	3/8	3/8	7/16	3/16	14.77
NT-2	7/16	7/16	9/16	7/32	25.84
NT-3	1/2	1/2	11/16	1/4	41.25
NT-4	5/8	5/8	3/4	5/16	70.30
NT-5	11/16	11/16	13/16	11/32	92.18
NT-6	3/4	3/4	3/4	3/8	101.25
NT-7	13/16	7/8	1	7/16	196.87
NT-8	1 1/16	1 1/8	1 1/8	9/16	322.73

Stocked in Grade ND-25



This Firthaloy Nail Die Barbing Machine in use at Pittsburgh Steel Company is familiar equipment in nearly every nail plant tool room in the country. For further information and prices on this modern aid to better production, contact your nearest Firth Sterling District Office.

R-333

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS: McKEESPORT, TRAFFORD, DETROIT, HOUSTON, WEST HARTFORD, YONKERS
OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND* DAYTON DETROIT*
WEST HARTFORD* HOUSTON* LOS ANGELES* PITTSBURGH* WESTFIELD N.J.

PRODUCTS OF FIRTH STERLING METALLURGY

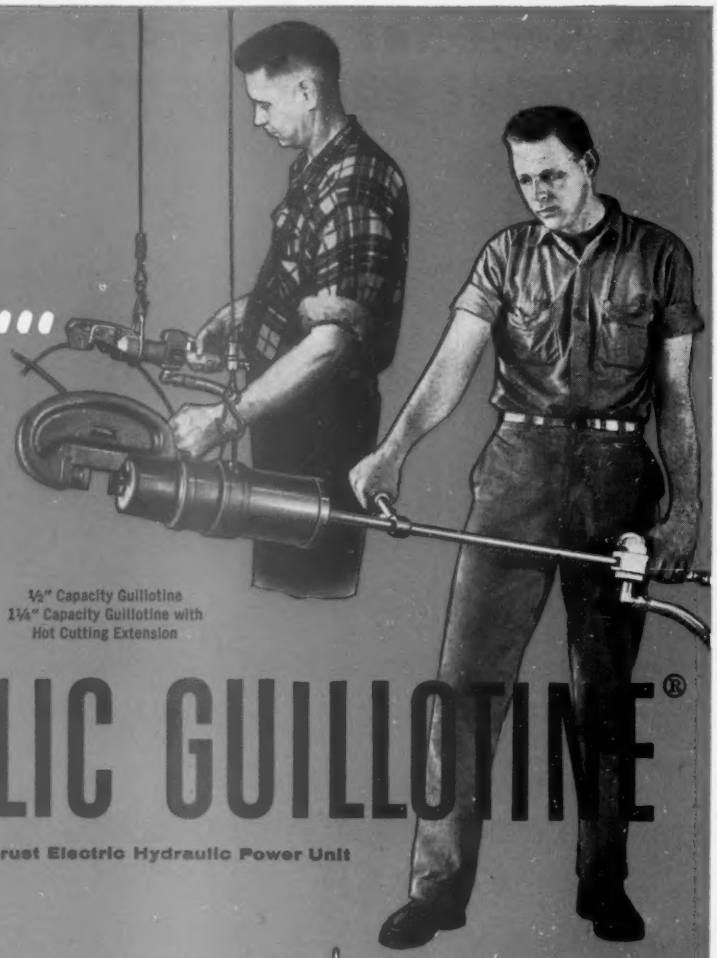
High Speed Steels
Tool and Die Steels
Stainless Specialties
High Temperature Alloys

Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

Zirconium

Fastest, Lowest Cost...

METHOD FOR CUTTING WIRE AND ROD



½" Capacity Guillotine
1¼" Capacity Guillotine with Hot Cutting Extension

MANCO

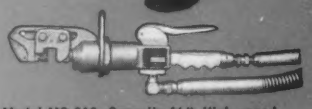
HYDRAULIC GUILLOTINE®

Powered by Manco Hi-Thrust Electric Hydraulic Power Unit

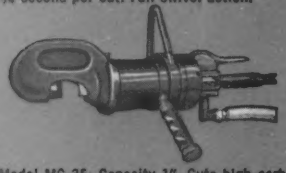
ENGINEERED FOR MINIMUM MAINTENANCE

These are completely re-engineered and redesigned versions of the famous Manco Hydraulic Guillotines used by virtually all major rod mills throughout the world. These new units provide even greater performance . . . and require an absolute minimum of maintenance. It is also possible now to operate two cutter heads off one power unit, either by using the new Manco HA-2 Hi Thrust power unit, or by adding the new Manco Auto-Selector Valve to present Manco power units.

Trademark Registered in Canada

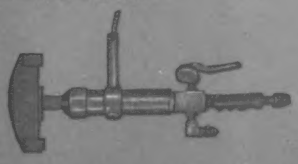


Model MC 210: Capacity ½". High speed . . . ¼ second per cut. Full swivel action.



Model MC 35: Capacity 1". Cuts high carbon material including reinforcing rod in only one second per cut.

Model MC 65: Capacity 1¼". Cuts 1¼" diameter steel in 2 seconds per cut. Can be modified to cut 1⅝" diameter aluminum.



MANCO HYDRAULIC ROD STRAIGHTENER

Ideal for straightening leading end of heavy coiled wire for insertion into drawing dies and cold heading machines. Capacity of ⅜" to 1¼" diameter steel rod.

WRITE FOR CATALOG

MANCO MFG. CO., Bradley, Illinois
Dept. No. W-2

Please send:
Catalog of New Guillotine Wire and Rod Cutters, and Rod Straightener.

Name_____

Firm_____

Street_____

City_____ Zone_____ State_____

PAN AMERICAN SUPPLY CO.

Presents

World's Most Advanced

UNIVERSAL MULTI-SLIDE BENDING MACHINE

The Pan American Supply Company
15 West 44th Street • New York 36, N. Y.
(OXford 7-6168)

has been recently established as a sales office for the United States and Canada for several leading West German manufacturers of wire-working machinery. The above photo shows the world's most advanced Universal Multi-Slide Bending Machine, Model RM25, made by the famous Bihler Co. The machine can combine up to 16 operations and take wire up to .080" dia., and strip up to 9/16" widths. Output up to 350 pieces per minute. The sales program of Pan American includes a full line of wire straightening and cutting machines, coil spring making —chain making—and special purpose bending machines.

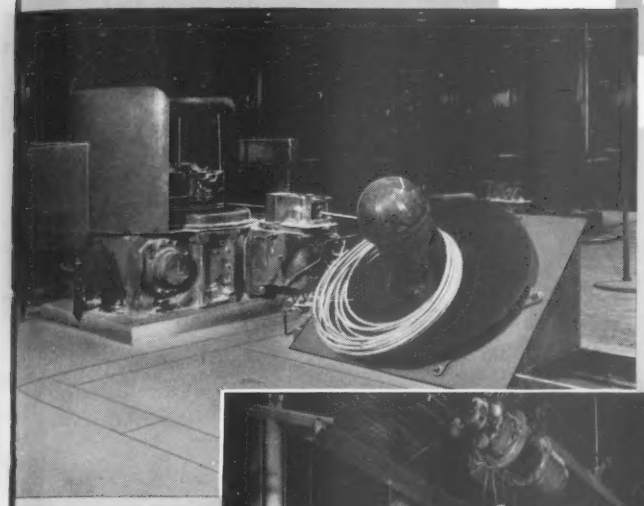
A TIP FOR THE TIMES

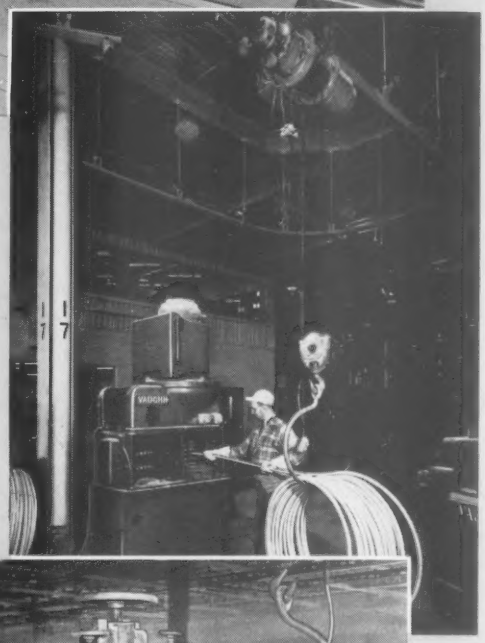
SPEED HEAVY WIRE PRODUCTION

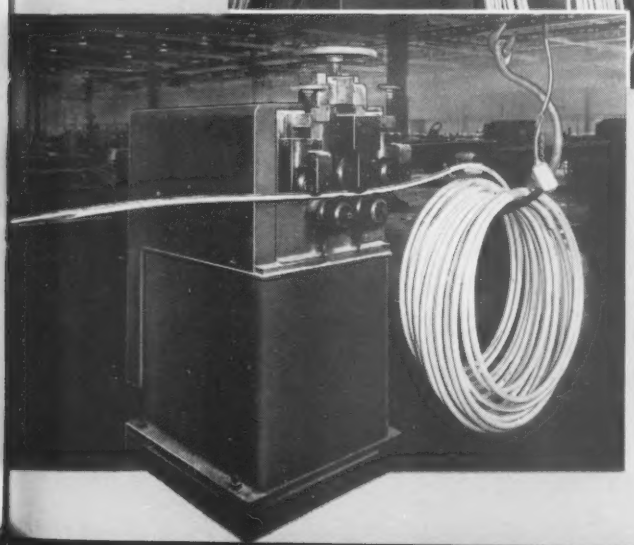
with ADVANCED

Vaughn®

AUXILIARY EQUIPMENT







new FLOOR REEL

with Positioning Base

Meeting today's need for better pre-drawing preparation and handling of heavy wire, Vaughn presents this new Floor Reel upon which the coil is lowered, with Positioning Base. This advanced equipment permits the straightened, pointed wire end to be passed through die to grip with small effort by the operator—and better production!

new *Extra-Heavy* 4-ROLL CONTINUOUS POINTER

This king-size pointer is capable of accommodating a range of wire from ½" to 1¼". It has two vertical and two horizontal rolls for ease of pointing without twisting the wire, and is in every way a heavy, rugged, long-life machine for the most arduous service.

new ROLL STRAIGHTENER

At the beginning of the pre-drawing preparation cycle is the new Vaughn 3-roll straightener, where a section of the trolley-transported wire coil is mechanically straightened. This makes handling to pointer and die box an easy matter, contributing to the time and manpower savings that help boost production with modern Vaughn equipment. Details? Gladly, on request.

The Vaughn MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Tighter Coils For Better Springs

Co-owners Walter Pesaresi (left) and James Berg of Winamac Coil Spring examine coil of Pittsburgh Steel Oil Tempered Wire and a stock of coiled springs, ready for shipment.

Pittsburgh Steel's O. T. Wire Does Job For Winamac Coil Spring

When a spring-coiling job comes along so tough that many spring-makers dodge it, a satisfactory spring usually depends on combining human know-how with the right kind of quality steel wire.

A balance spring that supports the mower on a farm mowing machine presented such a problem recently to the Winamac Coil Spring Company in Winamac, Ind.

This is the story of how one man's knowledge of wire and spring-making produced a more than satisfactory spring on a difficult job.

The 16$\frac{9}{16}$ inch long spring, coiled exceptionally tight and made of Pittsburgh Steel Company's Oil Tempered Wire, has 30 coils. Two and one-half coils at each end are passive. They hold a plug inserted by the farm implement manufacturer who buys the springs which support the weight of the mower on the tractor.

Springs often were rejected because of improper initial tension and burrs which interfered with insertion of plug ends.

Walter Pesaresi, co-owner and co-founder of Winamac Coil Spring Co. and a spring-maker all his life, credits three factors for his success in coiling the springs properly.

1. Selection of Pittsburgh Steel's Oil Tempered Wire.

2. Development of a new device which permitted tighter coiling.

3. Proper heat-treating techniques for stress-relieving the steel after coiling.

• **The Right Wire**—"Pittsburgh Steel's Oil Tempered Wire was a happy choice," said Mr. Pesaresi. "Its grain structure is right, it has a good surface, it's free from hard or soft spots and we can depend on it to hold uniformly to tensile strength specs."

• **Coiling Techniques**—Although Winamac Coil Spring has a hand-coiler matched by only three or four others in the country, Mr. Pesaresi found special techniques were needed to produce the balance spring with tight enough coils. To solve that problem, he designed and built a carriage and rollers that ride along the frame of the machine and guide wire on the mandrel. This device forces the wire being coiled tight against the wire just coiled. Exceptionally tight coils result.

• **Heat Treatment**—Coiling 21 feet

Balance spring is coiled on hand machine. It is equipped with a special carriage, designed and made at Winamac Coil Spring, which assures tight coiling.

Winamac uses other Pittsburgh wire than oil tempered. Here are tiny springs, made from music wire, for use in valves of Air Force oxygen masks.

Co-owner Walter Pesaresi examines finished balance spring, complete with plug which is inserted by customer who uses spring to support farm mower on tractor.

of .531 oil tempered wire into a 30-coil spring 16 9/16 inches long produces heavy stress in the wire.

That's why stress-relieving is necessary to impart exactly the proper physical characteristics.

In the mowing machine spring, stress relief is especially important. The spring is subjected to continuous flexing and must be capable of supporting widely varying shock loads throughout its full range of adjustments.

After study and experimentation, Mr. Pesaresi found stress relieving coiled springs for 2½ hours at 500 degrees Fahrenheit provided just the right combination of time and temperature to give the springs long life in service.

• **Dependability**—Winamac Coil Spring has come to depend on Pittsburgh Steel for more than oil tempered wire.

Winamac uses music wire, supplied by the Johnson Steel & Wire Company subsidiary in Worcester, Mass., for automotive springs, appliance applications and for such uses as a valve spring for an Air Force oxygen mask. (Photo at left.)

"We found from actual experience," said Mr. Pesaresi, "that Johnson music wire was the only wire that held its dimensions uniformly."

Whether your operations call for oil tempered wire, some other type of manufacturers wire, or a fine wire specialty like Johnson's music wire, you'll find what you want at Pittsburgh Steel.

The fine, consistent quality of Pittsburgh wire holds down your production costs and builds customer satisfaction.

Trained Pittsburgh Steel engineers are readily available with counsel and wire know-how that will help solve your problems. You can get that help today by calling any of the Pittsburgh Steel district offices listed below.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

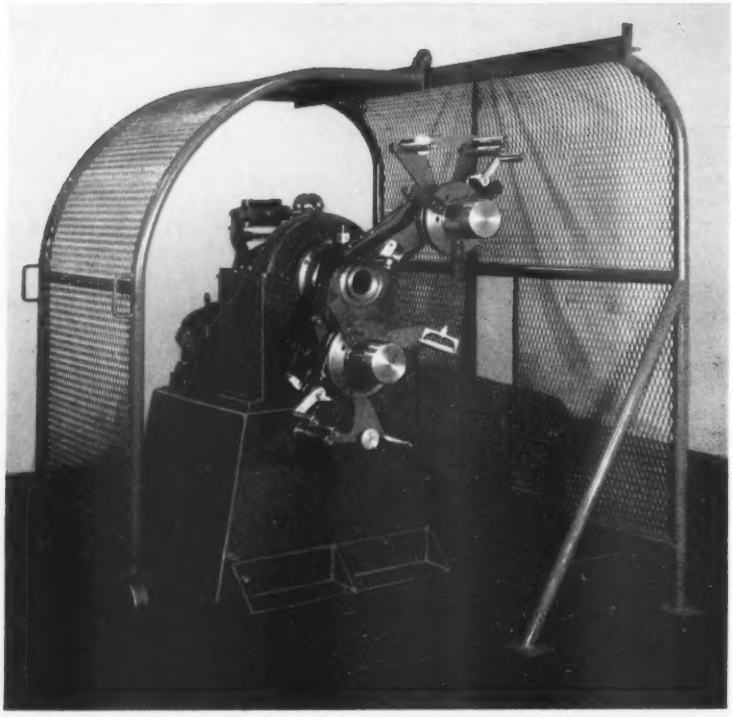
NEBUTTCO

High Speed TAPING MACHINES

For Fast, Accurate Application of Paper, Cambric, Natural or Synthetic Rubber on Electric Cables.

Nebuttco High Speed Taping Machines are available in single or multiple head units equipped with motor drive, capstan and take-up. Individual units designed to operate with other types of equipment can be furnished to meet your specific requirements.

Nebuttco Concentric Machines are engineered to operate at a maximum speed of 650 RPM with tape pads 24″ diameter x 4″ wide x 6″ eye.



Nebuttco Eccentric Machines are made with from one to four tape pads. Maximum speed of 300 RPM with tape pad 20″ diameter x 4″ wide x 3½″ eye.

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BRAIDERS • CABLERS • TAKE-UPS • BUNCHERS
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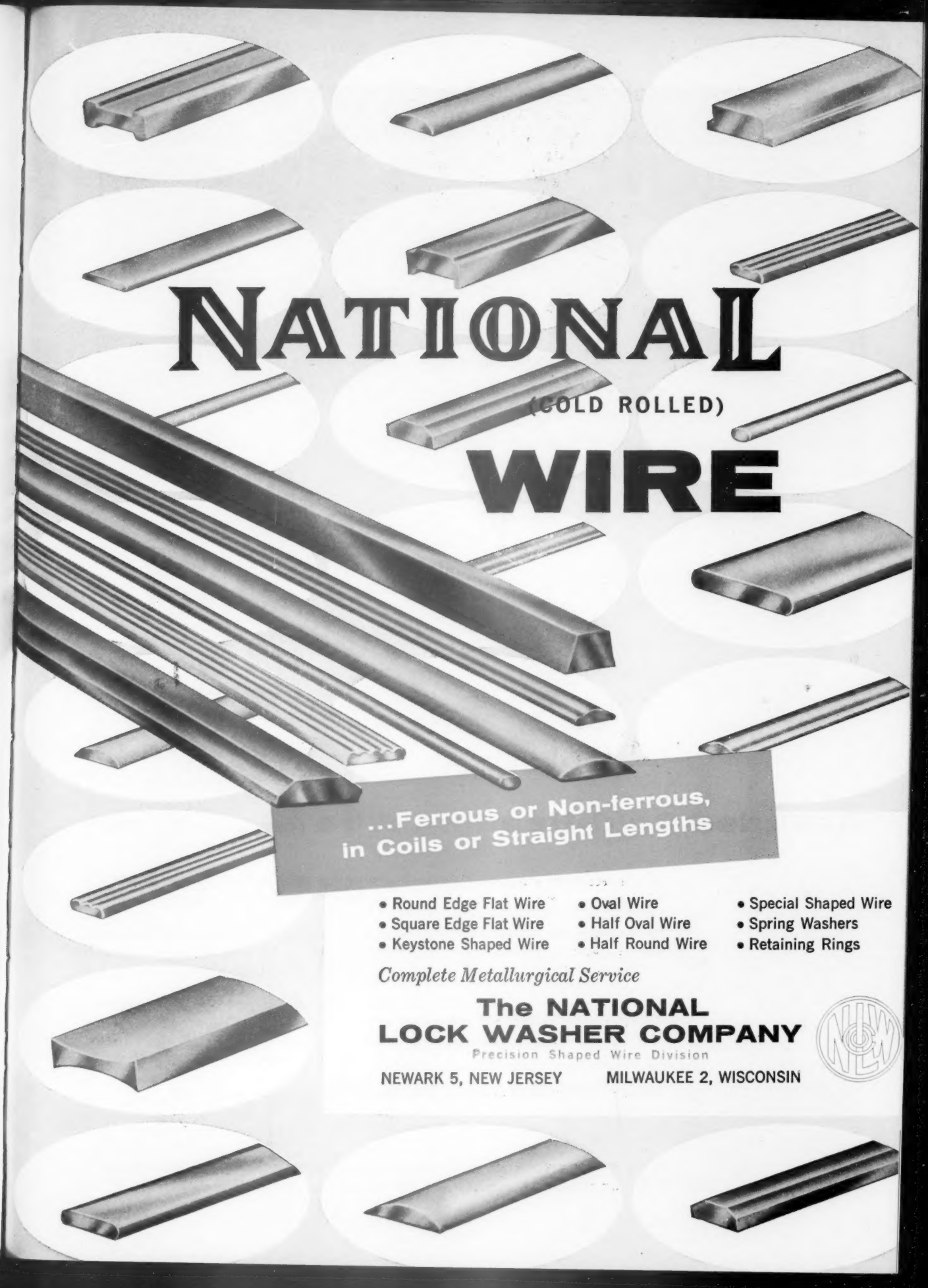
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WIRE
...Ferrous or Non-ferrous,
in Coils or Straight Lengths
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Extruded Cold-Heading Wire *(cartridge brass, 70%)*

Here is recognizably superior Cold-Heading Wire that offers many important fabricating advantages . . . and assures equivalent superiority in finished cold-headed products.

For example, this high-copper-content wire is hot extruded from billets produced by Scovill's unique CONTINUOUS CASTING process. Hence, it is far more uniform in chemical composition and physical properties, and essentially free from metal defects.

Prove this on your next wire order. Let us help you specify the proper closely controlled Scovill temper to produce more nearly perfect headed brass parts . . . whether you require "flow" characteristics for heading, or "flow" plus essential rigidity for secondary machining.

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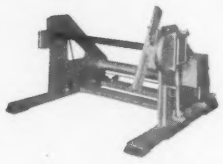
ARE YOU *PROCESSING* YOUR WIRE *ON* OBSOLETE *EQUIPMENT?*

SHAFT TYPE PAY-OFF



Hydraulic lift, electric brake tension. Available: Maximum reel sizes 72″ and 84″.

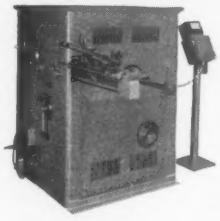
SHAFTLESS PAY-OFF REEL STAND

Hydraulic Lift, Pneumatic reel engagement, electric brake tension, 10,000 lbs. capacity. Sizes: 36″, 48″, 60″ and 72″.

HIGH SPEED AUTOMATIC SHAFTLESS TAKE-UP

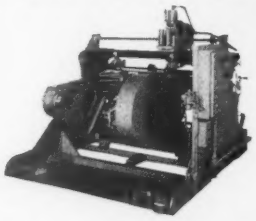
4000 FPM, completely automatic wire transfer. Available: 18″, 24″ and 36″.

AUTOMATIC RESPOOLER



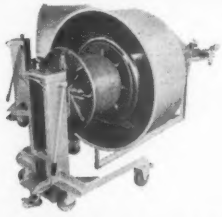
Speed to 1200 FPM on 2″ core. Automatically controlled wire speed. Optional — Automatic indexing arm.

HEAVY DUTY SHAFTLESS TAKE-UP



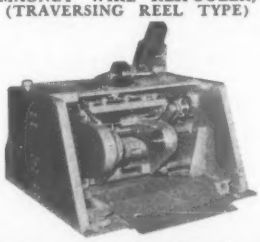
Especially adapted for handling stranded steel cable. Hydraulic lift, pneumatic reel engagement.
Sizes: 48″, 60″, 72″ maximum.

CONTINUOUS DUAL FLYER PAY-OFF



Pays off in wire speeds in excess of 3500 FPM. Simplified loading and unloading with a minimum amount of effort.

MAGNET WIRE RESPOOLER, (TRAVERSING REEL TYPE)

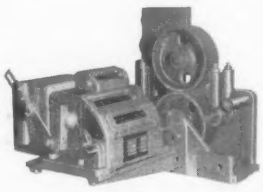


Respools round and rectangular wire up to 750 FPM at constant wire speed with infinite traverse adjustment.

WIRE SPARKER

Range 500 to 5000 volts. High Speed, high sensitivity.

MEASURING MACHINE



Up to 5000 FPM, open face with adjustable upper wheel tension.

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Manufacturing Corporation
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Over 40 years of Dependable Service to the Wire Industry

Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

Here at Athenia we concentrate on cold rolled high carbon flat steels, custom made of .45 carbon and higher, in widths from .015″ to 16″ and thicknesses from .001″ to .065″. Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

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DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties* WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

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Ask THE FIRMS WHO USE MICRO-WELDERS

. . . for continuous butt welding of ferrous wire, sizes .005″ to 1.250″

. . . for continuous butt welding of non-ferrous wire, sizes .010″ through 1.000″. . .

They will tell you that Micro-Welders are

- **Easy to Operate**
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OUR 30 YEARS OF EXPERIENCE IN THIS HIGHLY SPECIALIZED FIELD ARE AT YOUR COMMAND . . .

MICRO PRODUCTS CO.

MODEL S.E.M.T.
For Welding All Types of Fine Wire Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, sizes .005″ to .020″

Model S. E. M. T. is equipped with a temperature-indicating device for annealing and tempering, voltage regulator and meter to compensate for voltage fluctuations, wire cutters, extra large magnifying glass, fluorescent light and extension cord. Can be supplied for bench-mounting or mounted on 4-wheel truck.

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U.S.I.

Vol. III No. 1

POLYETHYLENE PROCESSING TIPS

PROCESSING CONDITIONS AFFECT STRESS-CRACK RESISTANCE OF POLYETHYLENE PRODUCTS

Most thermoplastic materials are subject in varying degrees to environmental stress-cracking . . . and polyethylene is no exception. Stress-crack failures may occur in polyethylene when the plastic is under high local stresses, either externally or internally applied, and in contact with soap, detergent or solvent.

Stress crack resistance depends on the resin used, and the processing conditions. The effect of polyethylene resin properties were discussed in the last issue of TIPS. This issue will be devoted to the effect of processing conditions.

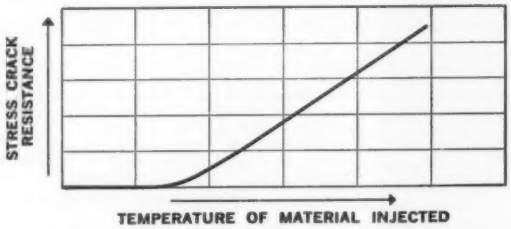
Apart from outside forces, there are, for a given polyethylene resin, two main causes of stress-cracking: locked-in stresses, and a high degree of molecular orientation. Locked-in stresses arise from uneven shrinkage during cooling. In molecular orientation, polyethylene molecules are comparable to iron filings in a magnetic field; they line up in force or stress patterns which, in effect, are stress concentrations along which fractures may occur.

Mold design affects stress cracking

To improve the stress-crack resistance of molded polyethylene, the molder should select his resin carefully on the basis of mold design, injection and mold temperatures, and, of course, the properties he wants in his end product.

Here, for example, is one way in which mold design can influence the choice of a resin: It is *generally* true that resins of higher molecular weight have relatively high stress-crack resistance. But in deep-draw molded items, or those with large cross-sections, resins of low molecular weight often yield a product with better stress-crack properties. This is because resins of low molecular weight—and hence, lower viscosity—permit the mold to fill more quickly. Under these conditions the material cools at a more uniform rate and fewer internal stresses are created.

Different flow rates, due to abrupt changes in mold cross-section or to sharp corners, may create points of stress concentration. These cannot always be eliminated, since every design is a compromise between mold engineering and product design.

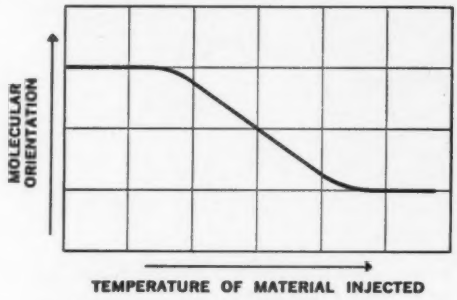


Stress crack resistance increases with higher stock temperatures in injection molding.

How Cold the Mold?

Higher production rates, made possible by running a cold mold, may be offset by a high incidence of stress-crack failures due to molecular orientation. This difficulty may be minimized by using a resin with the right flow properties—always bearing in mind that a practical compromise must be made with other desired end properties. Molecular orientation occurs when the hot resin comes in contact with the relatively cool walls of the mold. The outer surface of the stream cools faster than the interior and tends to slow down, while the material nearer the center flows unimpeded. The molecules tend to line up in the direction of flow.

This difference in cooling rates between the material at the periphery of the stream and its center also sets up internal stresses which induce stress-crack failures.



Molecular orientation is decreased with higher stock temperatures.

Mold Release Agents have some effect

Mold release agents may be of some benefit, as they tend to reduce the "drag" effect. However, caution must be used in their selection, since certain materials may induce stress cracking.

Compromise is often necessary

While no simple answer exists to the problem of stress-cracking in polyethylene products, resistance can usually be brought to a satisfactory level by choosing the best resin, making adjustments in molding temperatures, cooling rates and mold design. Since certain compromises must always be made, in selecting a resin and in processing techniques, processors can frequently use the services of a resin specialist. U.S.I.'s Technical Service Engineers are ready to discuss your processing problems, and to help in every way to solve them.

U.S.I. INDUSTRIAL CHEMICALS CO.
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Strong Restraining Influences... Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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...a totally new concept in wire insulation

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Problems of transformation, scuffing, flattening and scoring in the curing of thick, spongy insulation have been eliminated by Vertical CV. Already in commercial use, Davis-Standard Vertical CV machinery delivers cable insulation of better concentricity, more uniform diameter and improved values in dielectric strength and corona level tests.

There are numerous advantages to drawing the insulated wire downward through the vulcanizing tube:

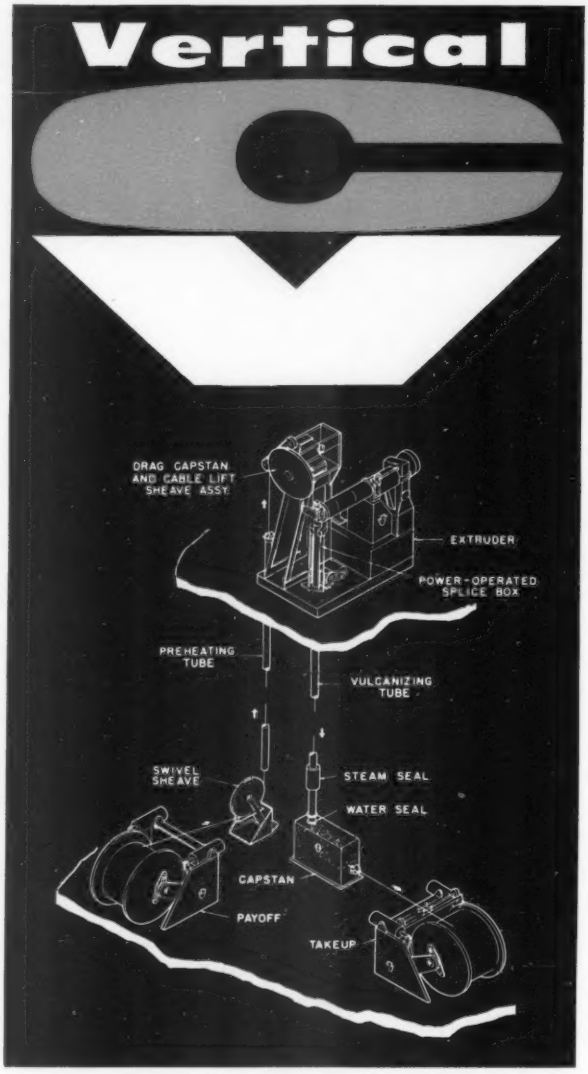
The easily damaged, uncured insulation does not come in contact with the vulcanizing tube until it has been vulcanized by steam and water.

The Drag Capstan, located above the Extruder, can be used to retract wire from the vulcanizing tube.

Vertical CV does not require the valuable floor space occupied by the conventional horizontal vulcanizing process.

Pay-Off, Capstan and Take-Up machinery are located on one floor for convenient reel-handling and operating adjustments.

The desirable feature of pre-heating the wire can be readily accomplished as it travels upward to the extruder.



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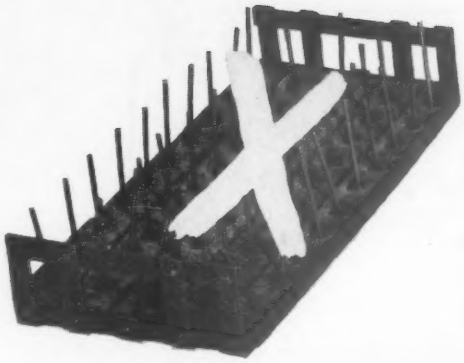
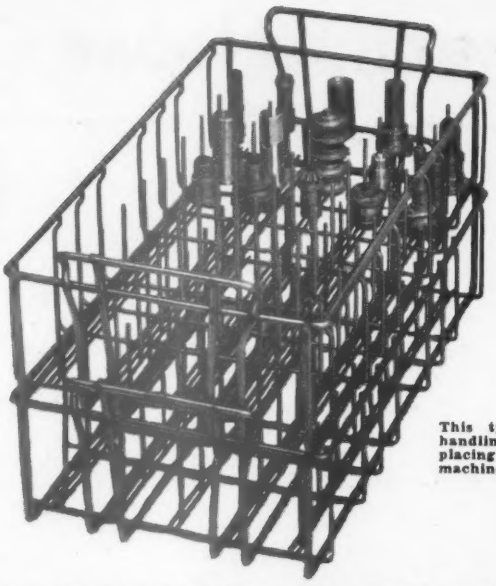
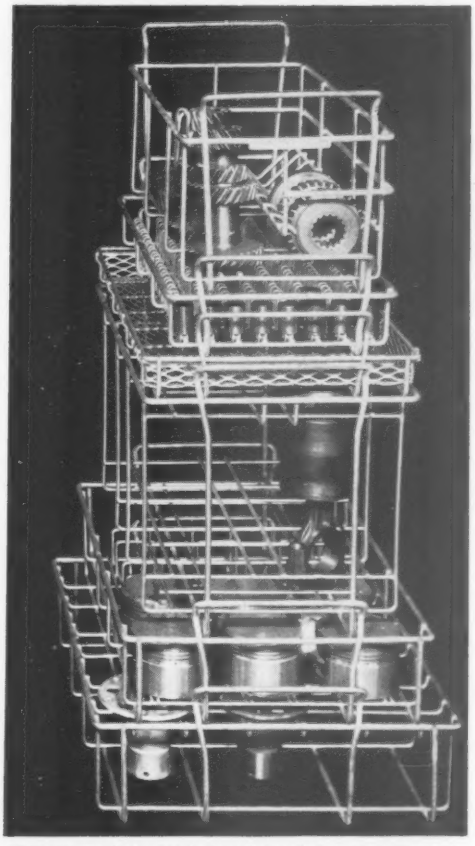




This type all-wire materials handling baskets are fast replacing old style home-made machine parts carriers.

YOUNGSTOWN BRIGHT BASIC WIRE

now used to fabricate stronger, longer-lasting materials handling baskets



All-wire baskets are designed to safely transport many different type machine parts.

OLD-FASHIONED wooden trays and boxes used for handling expensive machine parts during production operations are on the way out. Today, industry is turning to modern all-wire baskets to safely perform this important function.

For fabricating their brand of all-wire carriers, Detroit's Mid-West Wire Products Company uses Youngstown Bright Basic Industrial Quality Wire. They find it forms easily—but gives the required stiffness and strength needed in the finished baskets. It spot-welds fast and sure for permanent, strong construction.

Youngstown Bright Basic Industrial Quality Wire is quality-controlled through all stages of production from ore mining to final drawing. This guarantees a wire free from both injurious seams and piping, laps, die marks, internal tearing and cupping. Why not make it your specification? For further information or metallurgical assistance, write or phone today to your nearest Youngstown District Sales Office.

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THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

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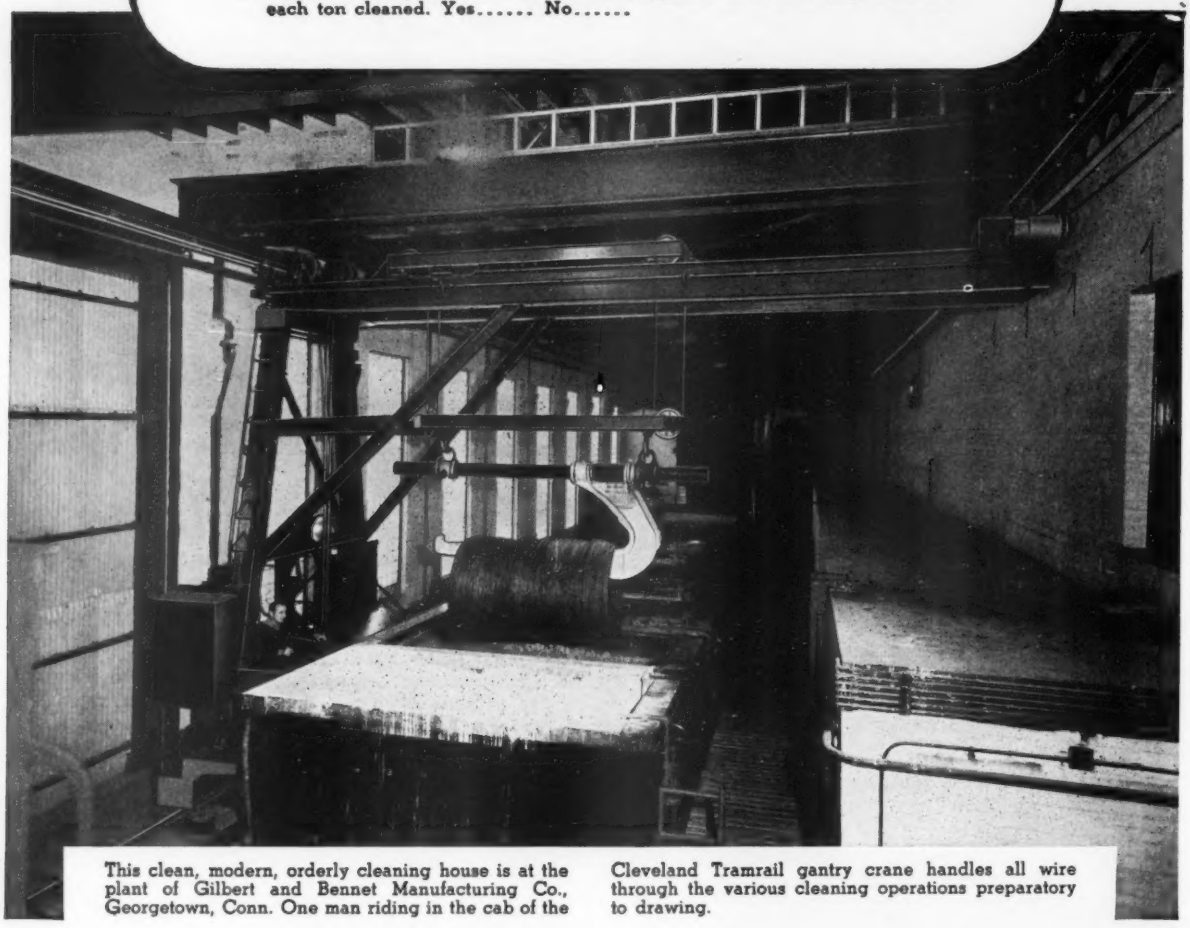
Cleaning House Check List

Judge For Yourself How Your Cleaning House Ranks

1. In our cleaning house one man handles all cleaning, rinsing and baking operations for up to 300 tons per turn. Yes..... No.....
2. Our cleaning house is always clean. Yes..... No.....
3. The cleaning house is orderly. Yes..... No.....
4. We have no traffic or congestion problems. Yes..... No.....
5. Maintenance is low. Yes..... No.....
6. Shutdowns because of equipment difficulties are few and far between. Yes..... No.....
7. Less than 10 sq. ft. of total floor area is required in our cleaning house for each ton cleaned. Yes..... No.....



This clean, modern, orderly cleaning house is at the plant of Gilbert and Bennet Manufacturing Co., Georgetown, Conn. One man riding in the cab of the Cleveland Tramrail gantry crane handles all wire through the various cleaning operations preparatory to drawing.

IF THE above reveals that your cleaning house does not rate high, it will pay you to get in touch with Cleveland Tramrail. Many cleaning houses have been converted to models of efficiency with Cleveland Tramrail equipment, and considerable floor space used for the old method released for other purposes.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 9223 E. 288 ST. • WICKLIFFE, OHIO

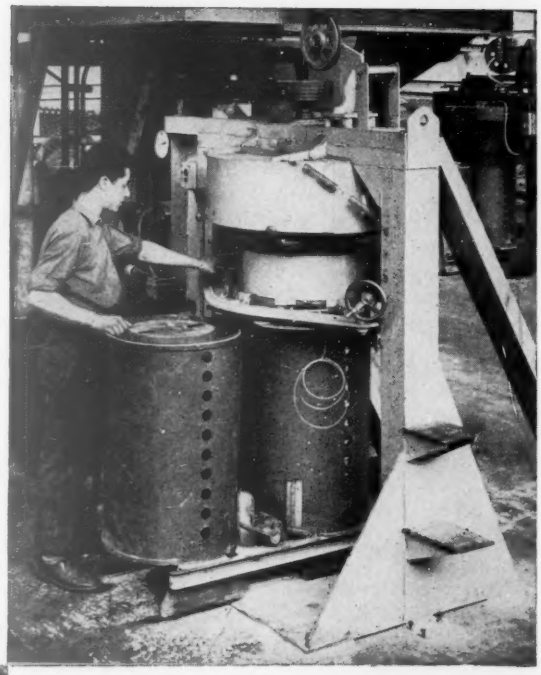
6.500

feet per minute

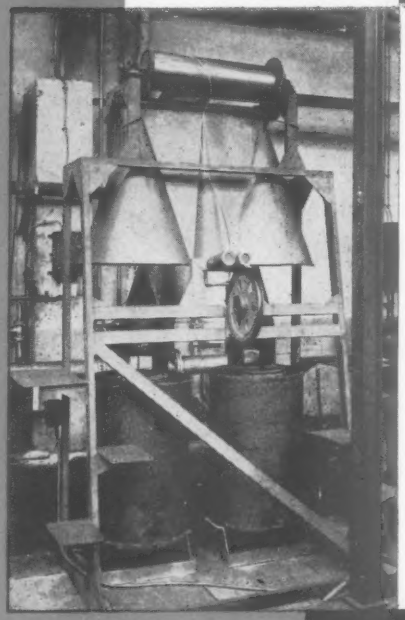
is the speed never reached before of the new continuous

Godderidge

Packaging Unit



Take-up device on a wire-drawing machine.



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OUTSTANDING FEATURES :

- Range of diameter: from 8 to 24 B & S
- Changing of drums at full speed
- Diameter control possible whilst running
- Both-ends of wire accessible, therefore welding and continuous supply of high speed extruders possible by new double

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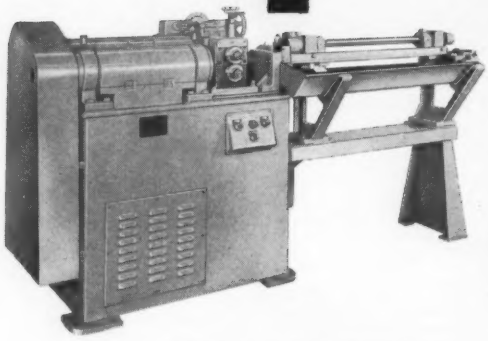

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for

LOWEST COST

Straightened and Cut Wire!

Savings with a SHUSTER

Above is the ALL NEW SHUSTER 2AV infinite variable speed, automatic Wire Straightening and Cutting Machine

wire size range:
1/16" to 5/16" mild steel wire, 1/16" to 3/16" high tensile wire, 50 to 200 FPM.
Send for complete details today!

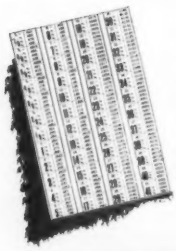
MATERIAL: Wire in coils purchased at lowest price.

STORAGE: Less floor space required than for storage of straightened and cut lengths.

DELIVERY: *When* you *need* it. Eliminates damaged wire waste.

COST: SHUSTER is the oldest (1866), most dependable name in wire straightening and cutting. Always ahead with the best, *tested* machine refinements, SHUSTERS cost *less* than any comparable machine.

Send us your wire straightening requirements from .020" to 1 1/16" for quotation. Let us show you that a SHUSTER pays its way faster than any comparable machine!



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Send for free, wall size split gauge wire chart from 41 gauge to 7/0.

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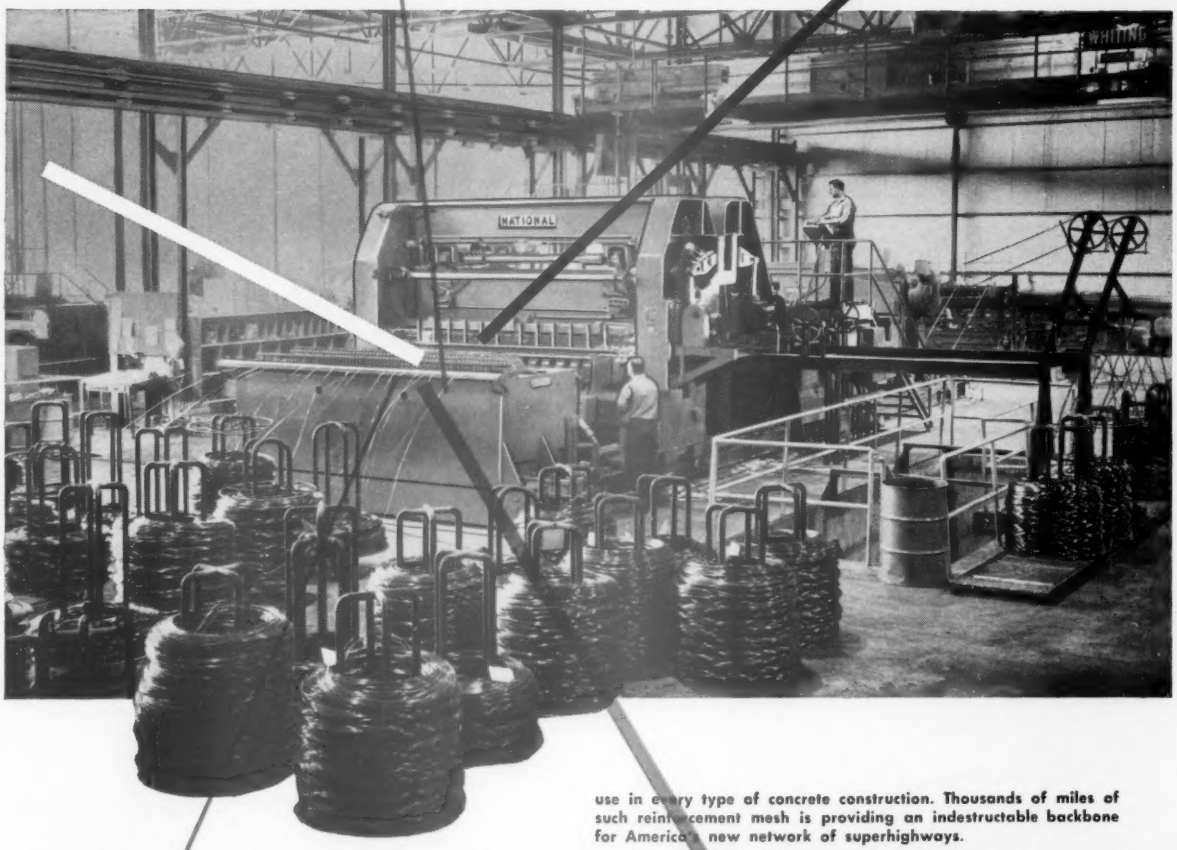
155 W. Adeline, New Haven, Connecticut

this NATIONAL ELECTRIC UNIT is a completely automatic high speed wire mesh manufacturing plant



Starting with coils of line-wire, this National Electric Wire Fabric Welder automatically turns out welded wire mesh in a variety of sizes . . . and at surprising speeds. In a single hour, as much as 250 miles of wire is transformed into high-quality wire mesh for all kinds of uses including reinforcement in concrete construction, fencing, etc.

Beginning at a line wire straightener unit, each wire is passed over as many as 10 grooved, staggered rollers for straightening.

Next, the line wires pass over welding dies within the machine's welding unit. Here, under a pressure of 60,000 lbs., a mat as wide as 200" is welded at each junction-point, the cross-wires being fed in automatically, at whatever spacing may be indicated by the reciprocating indexing-platen.

The machine next shears rectangular mats to the required size or winds welded fabric into coils of desired length. Finished coils are automatically discharged onto a ramp . . . rolling away to the loading dock or warehouse.

The rugged, steel-mill design and construction of this machine makes it possible to efficiently weld as many as 120 cross-wires per minute. Since 1945, National Electric Wire Fabric Welders have been dependably turning out welded wire mesh in numerous sizes, for use in every type of concrete construction. Thousands of miles of such reinforcement mesh is providing an indestructable backbone for America's new network of superhighways.

Complete automation, the key to profitable production, is made possible in National Electric Welding machines by means of utilizing automatic feeds, dial feeds, automatic positioners, multi-head design, automatic discharge devices, motor-driven rotating fixtures and sequenced ejectors. By their speed and accuracy, National Electric machines achieve amazing savings in time, labor, and cost-per-weld.

Write today for complete information on National Electric Automatic Wire Mesh Welders or any other special or standard welding problem that you may have.

50

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ELECTRIC WELDING MACHINES CO.

1880 N. TRUMBULL STREET
BAY CITY, MICHIGAN

25 YEARS EXPERIENCE DESIGNING AND BUILDING: SPECIAL & STANDARD • AIR • HYDRAULIC • MOTOR DRIVEN • SPOT • PROJECTION • SEAM • BUTT • FLASH • RESISTANCE WELDERS • PRODUCTION FIXTURES FOR ALL TYPES OF AUTOMATIC ARC WELDING.

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FOR WIRE DRAFTING

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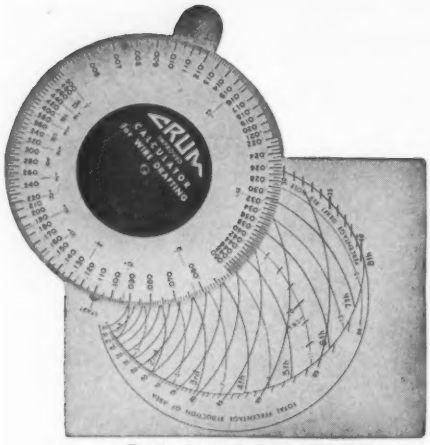
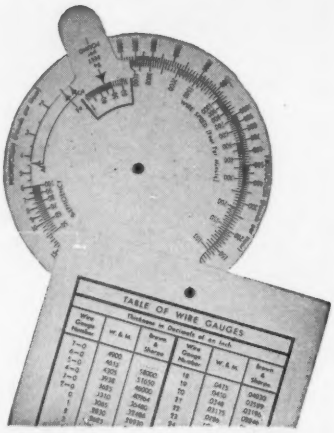


Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

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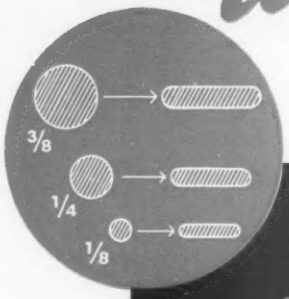
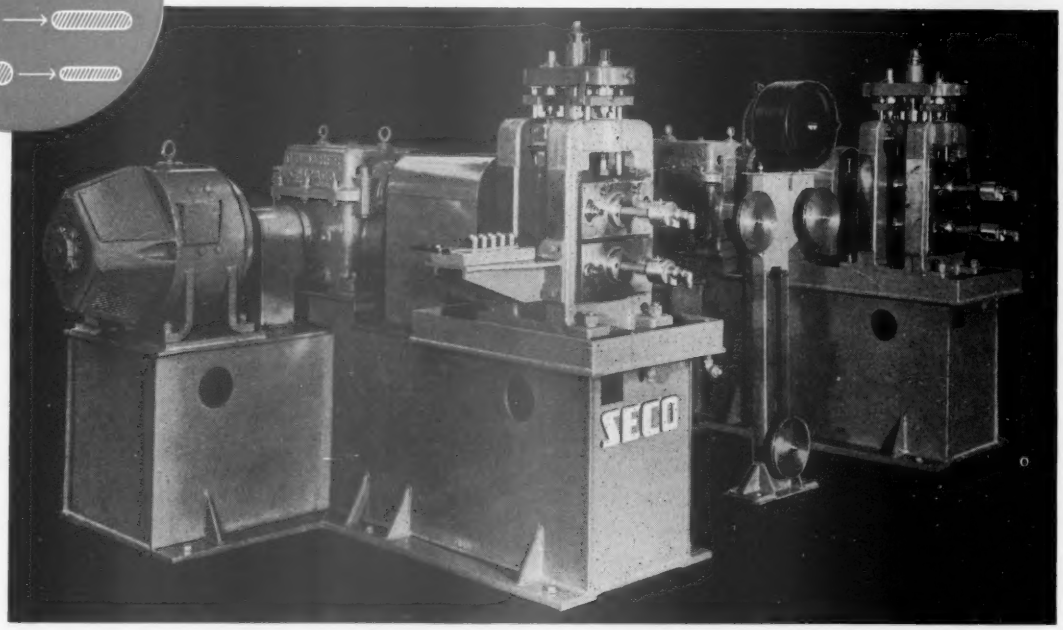




Shown above is the SECO 6" Tandem Mill with carboloy rolls and Timken Tapered Roller Bearings. Speed range is from 200 to 800 fpm. The mills are driven by DC motors through combination worm-helical reducers with universal joints, for silent and vibrationless operation. 8" and 10" mills of the same design and construction are also available. Suitable traverse reels are furnished.

Call or write for information and complete data. Consultation invited — no obligation.

STEEL EQUIPMENT COMPANY
P. O. BOX 737, WARRENSVILLE STATION
CLEVELAND 22, OHIO

SECO

MODEL

D-PAK

COULTER & McKENZI

FINE WIRE D-PAKERS

CONSTANT CONTROLLED TENSIO

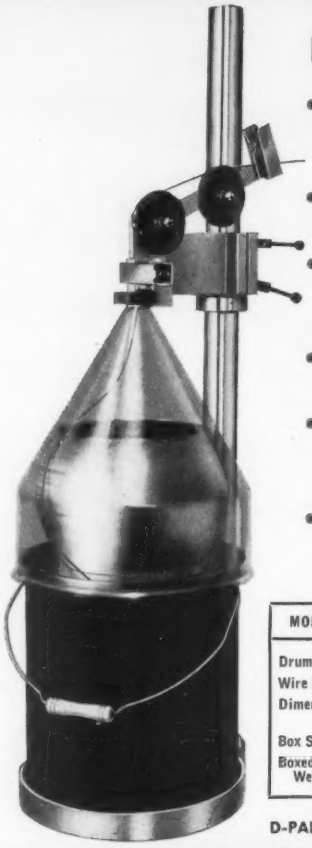
ATTACHMENT TYPE

D-PAK 100
Illustrated

- Meets all conventional industry D-Paking requirements
- 360° floor plane setting
- 180° vertical lead-in guide adjustment
- Snaps on both fibre and steel
- Shipped complete with dampening ring

MODEL	D-PAK 40	D-PAK 100
Drum Size	8"	11"-11¼"
Wire Sizes	AWG 27 and finer	AWG 17-30
Dimensions	9" Dia. X 14½" high	11½" Dia. X 16"
Box Size	10" X 10" X 18" high	12" X 14" X 20"
Boxed Weight	5 Lbs.	6 Lbs.

FLOOR TYPE

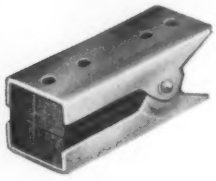


D-PAK 100-A, *Illustrated*

- Designed for D-Paking of wires at higher speeds with closer control
- Base may be permanently fixed
- Vertical height and horizontal plane settings may be fixed
- Adjustable for various wire sizes
- Swing top arm for ease of drum change and positive reset
- Dual capstans give greater range of tension adjustment

MODEL	D-PAK 40-A	D-PAK 100-A
Drum Size	8"	11-11¼"
Wire Size	AWG 27 and finer	AWG 17-30
Dimensions	9" X 12" X 34" high	12½" X 17" X 43" high
Box Size	10" X 13" X 35"	13" X 18" X 44"
Boxed Weight	20 Lbs.	33 Lbs.

ACCESSORIES



TENSION CLIP

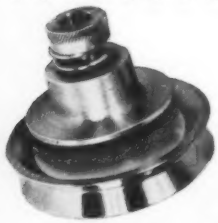
- Spring Loaded
- Reversible Wiper Felts

SIZE	CLIP
Dimensions	1" X 3"
Net Weight	¼ Lbs.

CORE BALL

- For Use with Floor Type D-Pak

SIZE	BALL 40	BALL 100
Core Diameter	6"	8"
Net Weight	1½ Lbs.	2 Lbs.



FRICTION CAPSTAN

- Adjustable Tension
- Precise Control

SIZE	CAPSTAN #1	CAPSTAN #2	CAPSTAN #3
Dimension	4⅜"	3-7/16"	2¼"
Wire Size	10-23 AWG	17-30	24-37
Net Weight	3 Lbs.	1 Lb.	½ Lb.

DAMPENING RING

- For Use with Attachment Type D-Pak

SIZE	RING 40	RING 100
Core Diameter	6"	8"
Net Weight	¾ Lbs.	1 Lb.

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SINCE 1843 BRIDGEPORT 7, CONNECTICUT, U. S. A.

The Wire Outlook

Floods of opinions on what will happen in 1958 crossed the editor's desk in January, a majority expressing faith in the future, with a few on the conservative side. Since they represent the thinking of industrialists, all men of prominence in their fields, these opinions are worthy of note.

Secretary of Commerce Sinclair Weeks looks for a mild dip followed by a climb. . . . President R. L. Gray of Armco Steel believes that 1958 will be a "breathing spell" in the boom of the last three years, with a "bounce back" year in 1959. . . . J. L. Mauthe, President of Youngstown Sheet and Tube, feels that this year will be a good one with no reason for "deep gloom or abiding pessimism." . . . N.A.M.'s head, M. C. Lightner, says that four out of five member companies expect sales to be as good or better than in 1957, but that wage-price inflation and strangling taxes must be halted to maintain our position. He also believes that the much-publicized expansion of industry has been over-rated and that current facilities do not exceed actual needs. . . . H. H. Fuller, chief executive of Bethlehem-Pacific Steel, states that the current recession is temporary and the year's business will show improvement. . . . Dr. W. R. G. Baker, President of the Electronic Industries Association, expects his industry's sales to top $7 billion in 1958 and be a little better than 1957. . . . William Bynum, Carrier Corporation's president, questioned over 4000 manufacturers, of whom 81% expect sales to equal or exceed 1957. . . . J. F. Miller, Managing Director of NEMA, predicts that electrical industry will produce 21 billion dollars worth of products in 1958—up 1% in dollar volume.

This small sampling of industrial opinion contains no suggestion of a continued boom, but does indicate a conviction that our economy is fundamentally sound and that it will survive the period of readjustment through which the country is passing.

As to metals, steel, of course, will be in ample supply. Copper, which has dropped from 36 to 27 cents a pound, is probably in for a long period of relative stability and good availability. Aluminum, in the face of continued production, has enjoyed expanding markets and an increasing acceptance for electrical uses. Lead and zinc have fallen in price, primarily due to foreign imports and are readily available. Nickel is in oversupply for the first time since before the Korean affair. Tin, too, is plentiful. It dropped 10 cents during 1957 and the price will probably range between 90 and 96 cents for this year.

Profits will be harder to make, due to costs and competition. Unemployment may rise to 4½ million, the highest in years, but no more than was previously considered normal.

Wire product imports rose sharply in 1957, with every evidence that those products will continue flowing into the country. Nail imports accounted for 25% of the sales of nails here. Over half the barbed wire sold came through import channels. Foreign-made galvanized fencing amounted to one-third of our domestic sales.

Backlogs of orders in the wire mills are low and many mills have further reduced production. Consumers are buying sparingly for immediate needs only. Some increase in the demand for high carbon specialties has been noted for the first quarter. Automotive orders have slackened a bit and will not increase unless the Spring sales of cars improve. Construction industry demand for reinforcing fabrics, as is usual in the winter months, is off, but should pick up in a month or so. Welded wire fabrics should be booming soon under the impetus of the Federal road-building program.

While the year has opened on a note of discouragement, it should wind up as a year of recovery. It was just the reverse of this last year. People want the good things of life as much as ever—and will have them, besides being well fed, clothed and housed.

We can't bring about better business by wishful thinking, but we can induce a state of panic by voicing pessimism. With our basic soundness as a foundation, the Administration's return to a policy of stimulating business should bear fruit.

Edmund Duval Sickels
EDITOR

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Warehousing-in-stock supply guarantees a quantity of the wire drawing products you need at all times . . . prevents possible production slow-down. What's more, our engineers are in the field, on call, to assist with any of your wire drawing problems

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 33 FEBRUARY, 1958 No. 2

A Modern Rod and Merchant Mill

by
W. R. Potts, Chief Engineer
and
R. M. Lang, Rolling Mill Superintendent
Atlantic Steel Company
Atlanta, Georgia

This paper, describing the new facilities recently placed in operation by Atlantic Steel Company, was presented at the Birmingham Regional Technical Meeting of the American Iron and Steel Institute on October 23, 1957, and is published, somewhat abbreviated, through the courtesy of both the Institute and the authors.

Both men are graduates of the Georgia Institute of Technology, Mr. Potts holding a degree of B.S. in Electrical Engineering and Mr. Lang a degree of B.S. in Mechanical Engineering. Mr. Potts has been with the company since 1926. Mr. Lang worked for the company from 1917 to 1919, rejoining it in 1923.

Introduction

Some 50-odd years ago, **Atlantic Steel Company** was located in a wilderness on the northwest outskirts of Atlanta. Today the entire plant is well within the city limits of Atlanta and consequently, when the company desires to make plant additions, serious thought must be given to the layout in order to conserve and make best use of the very limited acreage available.

★ ★ ★

The combination rod and merchant mill presented here is the end result of many conferences between our executives, operating and maintenance people, roll designers and plant engineers. Once the ranges of products to be produced by the mill were settled, the physical layout and the location of the mill became major items.

★ ★ ★

For the design and layout of the mill, we asked four of the well-known mill builders to present layouts. After many conferences with these mill builders and many layout revisions, a company was selected to design and build the mill. This was the **Morgan Construction Company,** which some 50 years ago had sold **Atlantic Steel Company** the combination mill that has been our bread-and-butter producer up to the present time.

Layout and Design

We soon found that the space requirements for the proposed mill were such that it would be practically impossible to tear out the old mill and place the new mill in the old mill's location. Eventually the area just east of the maintenance shops was selected as the location of the combination rod and merchant mill. This selection of location we feel was the best in spite of the extra costs involved. These extra costs included buildings, utilities and blasting of hard rock.

★ ★ ★

Layouts of the mill indicated a mill building 100 feet wide and 740 feet long to house the mill proper. Cooling bed products from the mill are processed in a warehouse building 200 feet wide and 260 feet long, which lies perpendicular to the mill building. This warehouse building is located at the south end of the mill building. (See Fig. 1)

★ ★ ★

The mill and warehouse buildings were designed to the following general specifications:

Mill type construction, 34 feet 6 inches to bottom chord, 26 feet to overhead traveling crane rail
Foundation concrete 2500 psi
Floor concrete—3000 psi
Twenty-two gage roofing
Twenty-four gage siding
Industrial type corrulux roof panels
Open type monitor running full length of building

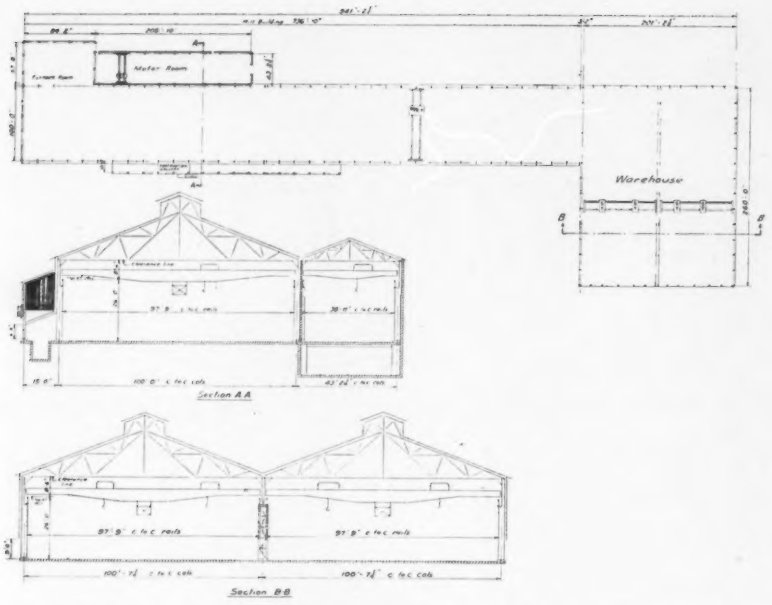

Figure 1—Section of mill and warehouse building.

The electrical equipment in the motor room is cooled by circulated air under a slight pressure and the air is filtered by American Electrocell electrical precipitation type air filters. Operations to date seem to indicate that this equipment will be satisfactory from a cleanliness point of view. (See Fig. 2)

★ ★ ★

The General Electric Company furnished all the electrical mill drives, auxiliary drives, and rectifying equipment. The Construction Engineering Division of the General Electric Company furnished all the electrical drawings for the installation of the mill.

★ ★ ★

On May 13, 1955 ground-breaking exercises were held. Spirit and enthusiasm ran high. On November 13, 1956, dedication exercises were held and the first merchant bar rolled. Eighteen months from breaking ground until the first finished product was on the way to one of our customers is not a record, but we at Atlantic Steel felt we had done an efficient job of getting an investment of $9,000,000 into production.

Electrical Equipment

Modern steel rolling mills depend to a large extent on the design of the electrical drives and the electrical control systems. A combination rod and bar mill, such as this one, calls for a wide range of speed control. High speed for small sections, low speed for large sections. Motors driving the stands of this mill were selected with a speed range of three to one, with the exception of the six-stand rod finishing drive, which has a range of two to one.

★ ★ ★

Basically this mill uses standard rolling mill motors of normal design with amplistat-amplidyne speed regulators.

★ ★ ★

The mill consists of seven roughing stands, six intermediate stands, eight finishing stands, one vertical edger stand and provision for adding three more edger stands. Table 1 gives the horsepower, speed of the drive motors, stands driven, and the power supply.

★ ★ ★

Direct current at 700 volts for

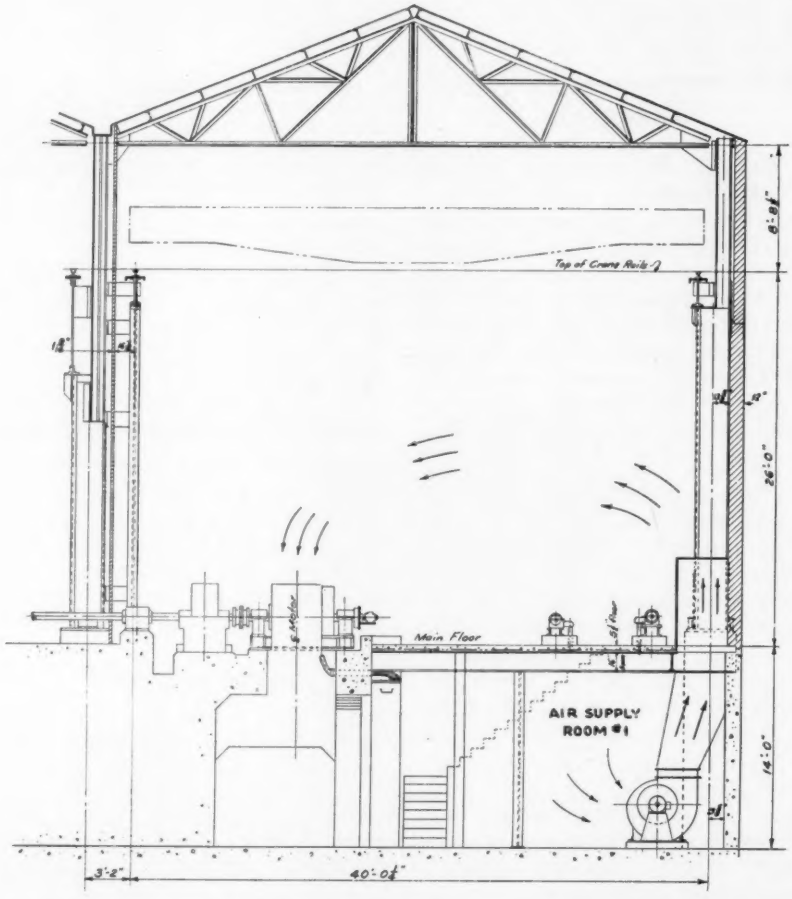

Figure 2—Section of motor room.

driving the mill motors is furnished by two pumpless type ignitron rectifier units, capacity 1500 kw and 3500 kw. Motors driving the roughing mill are connected to a bus that receives its power from the 1500 kw rectifier. The intermediate and finishing mills are connected to a bus receiving power from the 3500 kw rectifier. Equipment is provided for connecting the buses together, if desired, when all motors are operating at the same voltage level.

TABLE 1

Main Drives

Drive	Stand	Horse Power	Speed Range RPM	Power Supply
A	1-2	500	350/1040	
B	3	400	400/1200	
C	E-1 (Future)	200	300/1200	
D	4	400	400/1200	1500 kw
E	5	400	400/1200	700 v
F	E-2 (Future)	150	250/1000	
G	6	400	400/1200	
H	7	400	400/1200	
J	8	500	350/1040	
K	E-3 (Future)	150	250/1000	
L	9	500	350/1040	
M	10	600	350/ 980	3500 kw
N	11	600	350/ 980	700 v
P	E-4	150	250/1000	
Q	12-13	800	250/ 750	
R	14-15	800	250/ 750	
S	16-21	2000	500/ 990	

★ ★ ★

The two rectifiers are capable of operating over a voltage range of 350 to 700 volts D. C. This is obtained by using a combination of phase control and regulating transformer taps changed under load, with load ratio control.

★ ★ ★

The main motor room is 205 feet long, 40 feet wide, and 26 feet to top of crane rail. Ten of the main drive motors are located in the motor room, along with the rectifiers, 480 volt A. C. and 250 volt D. C. substations, 440 volt control panels, auxiliary and exciter motor generator sets, adjustable frequency control panel, and the master control panel. These are located on the main floor.

★ ★ ★

The rectifier transformers, and 480 volt A. C. transformers are located outdoors and are connected by bus duct to their associated equipment in the motor room.

★ ★ ★

The main motor room basement contains main and auxiliary control panels, motor operated rheostats, air filters, and ventilating fans.

★ ★ ★

The main drive motors in the motor room are equipped with non-recirculating down draft ventilating fans. By means of these fans, air is taken from the motor room floor area through the motors and discharged into the basement plenum chambers. Other fans discharge the air from the plenum chambers to the outside of the motor room.

★ ★ ★

Air is taken from the motor room, via tunnels, to ventilate the main drive motors located in the mill area and certain auxiliary motors requiring ventilation. These motors in the mill area have enclosures arranged to take air from beneath the base and to discharge it through louvered openings into the mill area.

★ ★ ★

With the mill proper, there are some 40-odd 230 volt D. C. constant potential mill type 600 series motors. These motors range in size from 7½ horsepower to 75 horsepower.

★ ★ ★

These constant potential motors receive power from a 500 kw, 250 volt D.C., sealed tube mercury arc rectifier. This rectifier is a complete metal enclosed unit substation with transformer and drawout D. C. switchgear section close coupled to the rectifier. This equipment is also close coupled to the switchgear section of the 480 volt A. C. substation.

★ ★ ★

A 100 kw, 475 volt D.C. motor generator set provides power for the auxiliary drives of the pouring and laying reels. The generator of this motor generator set is provided with amplidyne controlled voltage regulator.

★ ★ ★

The rotary drum-type shear at the cooling bed is driven by a 75 horsepower, adjustable voltage D. C. mill type motor. This shear is capable of cutting cooling bed products (1.6 square inches of cross-section) at finishing speeds up to 2000 feet per minute. This shear operates on a start-stop cycle for every cut. It was necessary to furnish the 75 kw, 250 volt generator with special characteristics to provide for rapid acceleration and momentary peak overloads.

★ ★ ★

The runout table rolls to the cooling bed are individually driven by 123 one-horsepower, 220 volt A. C. motors. A 300 kva adjustable frequency motor generator set varies the speed of the table motors over a range of 15 to 60 cycles. This adjustable frequency motor generator set is driven by a 300 horsepower, 700 volt D. C. motor connected to the D. C. bus furnishing power to the finishing stand motor.

★ ★ ★

The table motors are operated at 220 volts, instead of 440 volts, in order to use individual plug type connectors with protective fuses mounted in the plugs. This plug connector makes it convenient to disconnect or remove a table motor in case of trouble.

★ ★ ★

The power distribution system is simply this: The power is brought in at high primary voltage and transformed down to utilization voltages and delivered by

short secondary feeders to points of use. The A.C. power is supplied at 19,800 volts directly to the main drive rectifier regulating transformers, control transformer, and 480 volt transformer. The two outdoor circuit breakers are rated at 34.5 kv, 1,000,000 kva interrupting capacity. (See Fig. 3)

Electric Power

Georgia Power Company furnishes electric power for all operations at Atlantic Steel Company. We do not generate any A. C. power, although we do have a stand-by engine generator set that is rated 300 kw at 250 volts D. C.

★ ★ ★

Electric power is distributed to mills, warehouses, and offices by two overhead lines, which are of a triangle spaced wood pole pin type.

★ ★ ★

The rolling mill under discussion has a connected load of 8375 kva. This load is made up of 6500 kva to main drive rectifiers, 150 kva of control power, and 1725 kva of auxiliary power at 480 volts.

★ ★ ★

The reheating furnace, 90 tons per hour capacity, uses natural gas for fuel. At the present time a stand-by fuel is not available. Natural gas is purchased from Atlanta Gas Light Company. We have in the plant an underground pipe line distributing this natural gas to points of usage There is one central metering station, supplied by Atlanta Gas Light Company.

★ ★ ★

We have a two-stage rotary air compressor with a capacity of 750 cubic feet per minute at 100-120 psi, to furnish compressed air for this mill. This air compressor is located in the mill building just outside the motor room. In case of failure of this compressor, there is a tie-in with the plant compressed air distribution system. This plant system has a capacity of 3700 cubic feet per minute at 90 psi.

★ ★ ★

City water is used for cooling the rectifiers, air compressor, heat exchangers, and emergency cooling of the reheating furnace.

★ ★ ★

A separate recirculating water system was designed and installed for furnishing cooling water for the mill rolls, bearings, and reheating furnace of this mill. This water system has a capacity of 7500 gallons per minute at 40-45 psi pressure.

★ ★ ★

This system includes the following:

1. **Mill scale settling basin, 20 feet wide by 60 feet long by 23 feet 6 inches deep**
2. **Hot water sump, 20 feet wide by 60 feet long by 20 feet deep**
3. **Three vertical turbine pumps, each 2500 G.P.M. at 65 ft head**
4. **One forced draft cooling tower, capacity 7000 gallons per minute**
5. **Cold water sump, 21 feet wide by 30 feet long by 16 feet deep**
6. **Three horizontal centrifugal pumps, each 2500 G.P.M. at 116 ft. head**
7. **One storage tank, 150,000 gallon capacity, 100 feet above ground level.**

★ ★ ★

During normal operations the scale settling basin and hot water sump carry about eleven feet of water. Based on the theoretical demands of 4200 gallons per minute for mill rolls, and bearings, there is about 20-minute retention time for scale to settle to the bottom of this scale pit.

★ ★ ★

Mill scale is removed from the scale pit with a crawler-type crane and bucket, at regular intervals, depending on tonnage produced by the mill. Scale removal is scheduled during down time of the mill.

★ ★ ★

Provisions have been made for adding a drag flight type conveyor for continuously removing scale from the scale pit at a later date.

★ ★ ★

To date this mill has created a maximum 30 minutes demand of 5040 kw. The auxiliaries accounting for a good 20 per cent of the demand. Actual kwh of energy consumed during the period April 29 to June 24 was 1,228,780 kwh. Sixty-two and one half per cent of this went to the main drives, 37½ per cent to the auxiliaries. Tonnage produced during this period was 14,329. Based on these figures, the average power requirements are about 86 kwh per ton produced.

★ ★ ★

Georgia Power Company meters

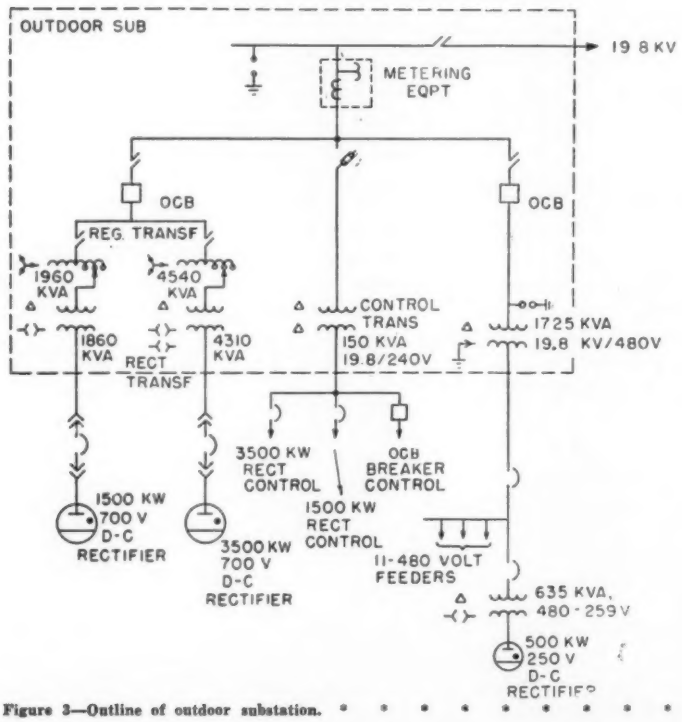

Figure 3—Outline of outdoor substation.

on the overhead line serving this mill indicate an average calculated power factor of 81 per cent during July and August, 1957.

Rod and Merchant Mill

The mill consists of 21 stands, 15 of which are used for rolling merchant products, and all 21 for rolling small rods in coils. It is served by a double-fired Rust continuous furnace for heating billets and has a 270 foot long cooling bed for the finished merchant products. Rods are coiled by six laying reels when rolled three strand, and by two pouring reels when rolled single strand. The pouring reels will also coil nut stock, squares and small flats. (See Fig. 4)

★ ★ ★

The products which are expected to be rolled are:

Rounds—⅜ to 2 in.
Squares—½ to 1¼ in.
Plates or flats— 1 x ¼ in. to 6 x 1¼ in.
Angles—1½ x 1½ in to 4 x 4 in.
Channels—3 and 4 in.
Beams—3 and 4 in.
Reinforcing bar—#3 to #11 inclusive
Rods in coils—#5—.218 to ½ in. dia.

★ ★ ★

These products cover a wide range found necessary for our Southern trade, both in merchant products and wire sizes.

Management's decision to build a combination mill, rather than a mill only for merchant products or only for rolling rods, was guided by trade demand as well as economics. In designing such a mill, ingenuity was used to get certain novel features which we think make the mill one of the best ever built.

★ ★ ★

The mill was built to roll more tons per hour of the products mentioned, with less labor, than other mills for the same purpose.

★ ★ ★

The builders commenced this economy with what is ordinarily called the billet skids. A machine called the billet unscrambler takes billets from a lift truck in bundles of eight tons and straightens them out and deposits them one at a time onto the charging rolls. All of this equipment is operated from a control desk by one person, where on our old mill it takes three people.

★ ★ ★

The pushout is similar to older types, but improved with hydraulic shifters to position the machine. On the delivery end of the furnace the mechanism has been greatly improved. The pullout rolls can be positioned to each of three passes when rolling rods, or any position which may be needed for rolling merchant products.

★ ★ ★

We'll skip the continuous roughing train for a moment, to the skew tables and repeaters. A mill built to roll only small merchant product sizes and rods would need only repeaters. However, since the range of sizes to be covered could not all be repeated, it was decided to install Y-tables fully mechanized, so that no person with tongs would be needed to work the required passes to make any product rolled.

★ ★ ★

The mill has both bar and rod, and strip repeaters, which are necessary to handle the full range of sizes. The rod and bar repeaters are three-strand for rods and deep enough to handle bar sizes. We also repeat ovals, diamonds, and square bars, and it is necessary to have special equipment for this purpose.

★ ★ ★

At number 12 stand the mill is equipped with both 11 inch and 13 inch stands for rolling small and large sizes. These stands, when used on merchant products, are used singly, but on rods they

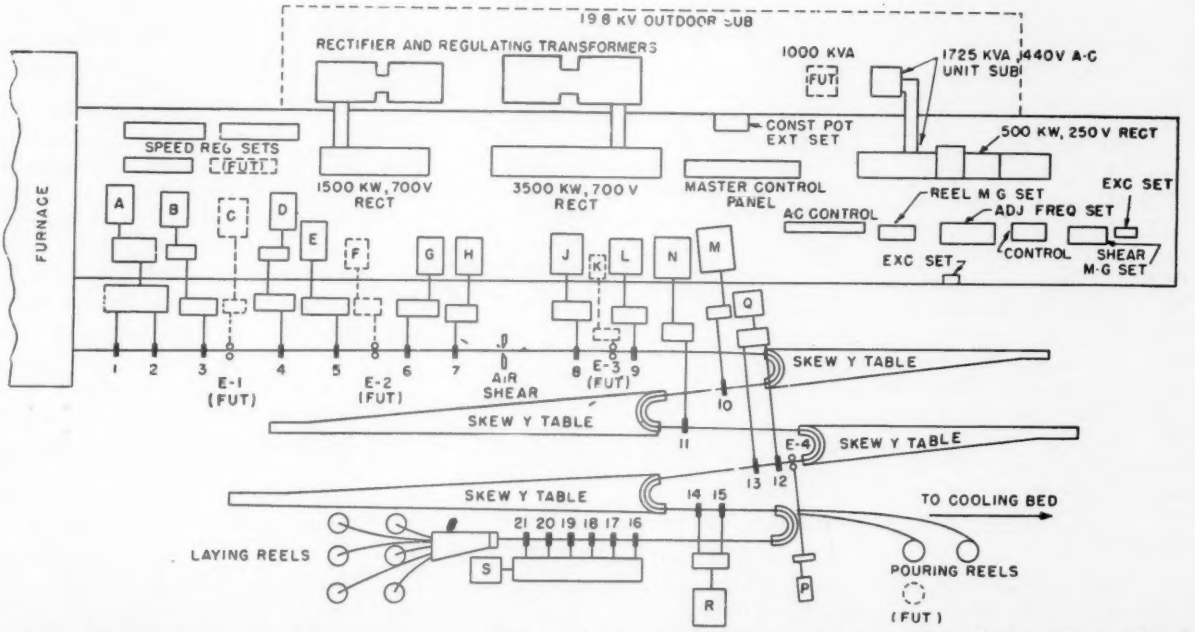

Figure 4—Arrangement of mill and motor room.

are used as a duo on tandem sets. This feature, in addition to allowing the use of small and large rolls for such products, has one large motor to drive the two stands which, when used singly, gives 800 hp for the one stand. This has proved very helpful in making large angles and flats where the load is heavy. (See Fig. 5)

ries coils from the laying or pouring reels a distance of 230 feet. They are then automatically lifted off by a hook conveyor which travels some 700 feet to the wire department, where they are removed with air-operated hooks. A lift truck with ram completes the operation.

★ ★ ★

omical to operate. The thrust bearings are on the grease system. The mill couplings, gear type with splined spindles and gear teeth, were built to allow angularity of the amounts to roll the widest section called for. These couplings are rattle-proof and almost indestructible.

★ ★ ★

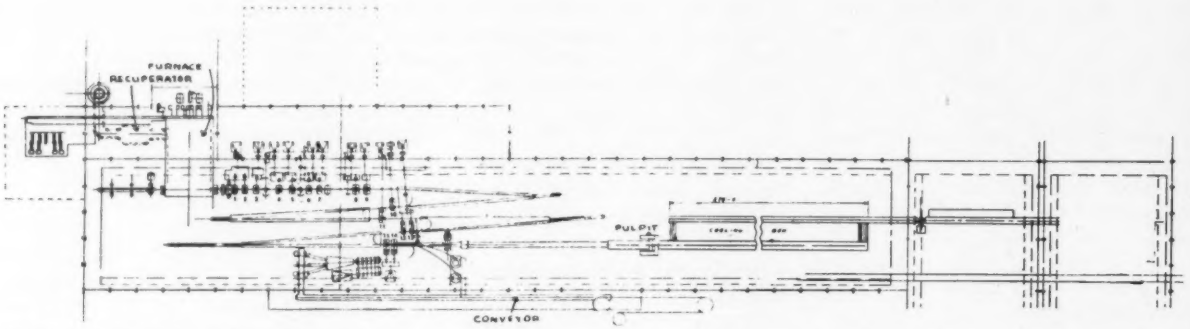

Figure 5—Layout of bar and rod mill.

The drum, or parting, shear is located some 50 feet from the finishing stand toward the cooling bed. It is a rotary shear used to cut a long bar into cooling bed lengths. It has capacity to shear up to 1.6 square inches and is used on flats, rounds, squares, re-bars, and with special blades, angles. It is a most useful piece of equipment when a single-sided cooling bed is used.

★ ★ ★

The cooling bed is 270 feet long, with 17 machined notches to carry over any size product we wish to roll. It is fully mechanized and operated by push-button control from the mill end, giving the operator visibility to both the furnace and the shears. This we think is the best cooling bed which has been built for these products. The men needed to operate the cooling bed—six in all—are the least number used on any bed for this purpose. The product shears and back shear table are fully automatic. We designed and built a set of mechanized cowhorn bins to put more bars in when shearing a number of different lengths simultaneously.

★ ★ ★

In the rolling of coiled rods, a very fine rugged slat conveyor car-

The mill itself consists of four stands of 16 x 38 roughing, three stands of 14 x 34, two roughing stands 12 x 28. Then, in the cross-country, we have four stands 12 x 28 and two 11 inch stands. The six-stand rod train is 10 x 24.

★ ★ ★

The bearings for this entire merchant mill are totally enclosed with synthetic liners of Ryertex. The thrust units on the mill, with the exception of stands 16 through 21, are special mounted, double-race SKF ball bearings. These are attached to the outside ends of the rolls with Allen-head set screws. The bearings, for both load and thrust, are assembled to the rolls on the bench before being put in the mill. The housings are all closed type with exceptionally wide windows to allow large collared rolls for beams and shapes. The bearings for the rod train, 16 through 21, have a synthetic thrust collar built into the totally enclosed load bearings. These are the same as on merchant mill, except for the thrust collars.

★ ★ ★

The mill load bearings are supplied with clean water from a circulating system, and have proven very satisfactory as well as econ-

The use of hydraulic fluid to hold up the top roll of all housings, as well as for sliding the housings on the bedplates to get passes aligned, is a great help to operators. The repeaters are fixed in one position, and when moving from pass to pass on the rolls, the housing is moved by hydraulic cylinders. There are a number of other uses of hydraulic pressure such as the billet unscrambler, the pushout and the billet selector. In all cases it has proved very dependable.

★ ★ ★

The mill is provided with nine stands of continuous roughing because of rolling rods. Four cross-country stands with both repeaters and skew tables are for rolling merchant products. It was thought necessary to have four open passes for possible future shapes to be rolled. The mill was laid out to have three vertical sets in the roughing train to edge flats and angles. The foundations are in place for their future installation. When edging is necessary in the roughing train, it is now done in the horizontal stands. The cross-country stands numbers 10 and 13 are also used as edgers on flats.

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The oil-resistant, ozone-resistant nitrile rubber

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- High abrasion resistance
- Excellent oil, grease and chemical resistance
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...PLUS PERMANENT BRIGHT COLORS

In addition to the suggested uses, you will think of dozens of other applications where wire jacketing with all these properties can serve either an aesthetic or utilitarian purpose.

One of Naugatuck's technical representatives will be happy to discuss with any prospective user the formulation of the Paracril® Ozo compound which makes possible this combination of properties... not only in wire jacketing but also in shoe soles, hose jackets, weather stripping and other vulcanized rubber products.

Naugatuck Chemical

Division of United States Rubber Company, Naugatuck, Connecticut

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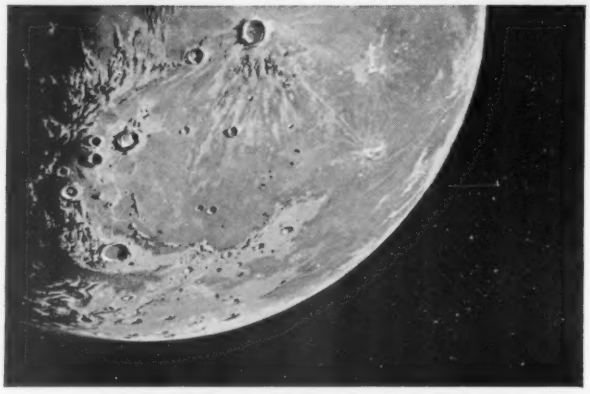
Naugatuck NAUGAPOL

SPECIALLY-PROCESSED SBR POLYMERS



dry . . . . . drier . . . . . DRIEST

DRYNESS in all the above examples stems from lack of moisture in the surrounding environment. Naugapol® styrene-butadiene rubber, on the other hand, is dry—and stays dry—*in spite of* surrounding moisture!

That's because we specially process all eight types* of Naugapol polymers to eliminate moisture-absorbing salts. Acid is used in place of salt as the coagulant following polymerization, and extra straining and milling further remove water solubles. As a result these premium grades of rubber are noted for their:

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These properties make Naugapol polymers ideal for use in the extruding of wire and cable insulation and the manufacture of mechanical rubber goods where low moisture absorption properties are required. For more details on these and other special grades of synthetic rubber, write us about your requirements.

*Naugapols are made in types 1016, 1018, 1019, 1021, 1022, 1023, 1503 and 1504.

Naugatuck Chemical

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Reheating Furnace

Before discussing operations, the furnace must have a brief on its type, size and capacity.

★ ★ ★

In almost every mill recently built and installed such as ours, there has been some lack and limitations to the heating furnace.

★ ★ ★

This furnace was designed to use billets 2½ x 2½ x 25 to 30 feet up to 3½ x 3½ x 30, or slab sections 7 x 3 or smaller. The tons per hour had been specified as 80. However, it is designed to do much more than that. It is double fired, with both sets of burners on top of the billets.

★ ★ ★

The heating zone, which has its burners located about half-way up from the pushout, is fired with much larger burners than the soaking zone. The furnace is 55 feet long from pushin to pushout, and has water-cooled skids for 12 feet in back to allow additional heating capacity by giving a wrap-around effect to the outgoing flame before it gets to the recuperator. The Hazen type recuperator is located in the flue between furnace and stack. The stack is a Morgan ejector type. The controls for the furnace are Askania hydraulic. As previously stated regarding the mill, no manual labor is required to operate the furnace. It is all push-button controlled from a main panel near the pushout. We do not at present have any stand-by fuel but could convert to oil with simple changes.

★ ★ ★

Many pages could be written on the special features of this furnace. It is an excellent furnace for our work, and so far has given no trouble. It is large enough, it is economical, it is easy and simple to operate. It is a rolling mill man's dream furnace.

Operations

Billets for this mill are made on our 25-inch blooming mill and 14-inch continuous billet mill. The 2½ to 3½-inch square billets were a part of the billet mill passes for rolling other sizes. However, the 7 x 3 inch and other slab sizes were all new and were figured out to use a rectangular shape bloom from the bloomer and just draft it lightly in the 14-inch billet mill. Shearing these large slabs has presented a problem. The billet flying shears will cut only 16 square inches, and as 7 x 3 was more than that, it was decided to shear these at the up-and-down crop shear entering the 14-inch billet mill. To shear to length on this plan is rather difficult. If trying to get near 30 feet long, and a billet 31 feet is made, it will be too long to go in the 13-inch mill furnace. At the 13-inch mill furnace we can use 25- to 30-foot lengths and thought it an excellent idea to do so; however, the method of push-off at the cooling bed makes a uniform length billet very desirable. The random length is still in use for rods where the weight of coils can vary.

★ ★ ★

The billets are made at the billet mill, which is some 700 feet from the 13-inch mill, and are loaded onto bolsters and hauled with a straddle truck. At the 13-inch mill we have a large area paved with slag where the billets and bolsters are stored for later use. Near the unscrambler skids an area of 20,000 feet square is paved with concrete. Here a 15-ton Ross Clark lift truck takes billets off the bolsters and places them on the unscrambler. This plan was, for us, better than hauling billets on a railroad car, unloading them for storage with a locomotive crane, and then using an overhead craneway and crane to place them on the skids or unscrambler. We believe that we have the best system for us.

★ ★ ★

The first operating crew was brought down from the old rod mill and rolling was commenced on October 1, 1956. It was after many meetings among our industrial engineering department and management that a rate for each of the jobs on the new mill was set up. It was also after several meetings with our local union committees that this first crew was selected. The crew was selected by accepting the man in the old mill with the most seniority on the job nearest to the job he desired.

★ ★ ★

The first size attempted was No. 6 reinforcing bar, using a 3½ x 3½-inch x 30-foot billet. This was an original layout furnished by **Morgan Construction Company** using the passes, guides and troughs sent by them for this size. The billet length required parting for cooling bed length, so the drum shear was used. The bar was made using seven passes in the roughing mill and four cross-country passes, and also using the Morgan three-strand rod and bar repeaters.

★ ★ ★

The next rolled was No. 7 reinforcing bar and then No. 8, all rolled with the Morgan equipment for 3½ x 3½-inch billets. We did well on these sizes and were rather proud.

★ ★ ★

Next size attempted was No. 11 bar and, according to Morgan Company, we were supposed to use the skew tables. This was when we found that skewed rolls would turn a small or narrow bar over and over as it approached to enter the next pass, and it would not enter. We decided to skip most of that size, as well as No. 10 and No. 9 bars, until a better way could be devised.

★ ★ ★

Our roll designer later laid out a way to roll these sizes by using the strip repeaters and we now have no trouble with them.

★ ★ ★

The next size attempted was No. 5 bar using the Morgan layout and the rod and bar repeaters. It rolled fairly well, though it was the first size which had to be cut more than once on the drum shear.

★ ★ ★

The No. 4 bar using a 2½ x 2½-inch billet completed the rolling of the first group of sizes. We tried to roll it at 2000 feet per minute but could not keep it on the cooling bed. The insulated rollers, the electric eyes, and sometimes the

operator, fouled up the situation by doing the wrong thing. We dropped back to 1600 feet per minute and did better.

★ ★ ★

Following reinforcing bar we changed the mill to flats. The small sizes, 2 to 3¼ inches wide, formerly were rolled on the old rod mill and the larger sizes, 3½ to 6 inches wide, had been rolled on our 14-inch billet mill. This was the first time that we had used the roughing mill for horizontal edging. Also we used two cross-country stands, numbers 10 and 13, for horizontal edging, giving three edging passes on all flats. This made excellent corners and a nice looking, well rolled bar.

★ ★ ★

At this stage of rolling on our new mill, we had not commenced using the strip repeaters, so all flats rolled were worked with the skew tables. We really had a problem getting homemade bar turners to work on turning up a wide flat off the skew table to enter the cross-country edging passes. It has been said that necessity is the mother of invention. We were in serious trouble. So one of our roll engineers designed a simple square box about 8 inches with a square bar ¾ inch by the length of the box, approximately 2½ feet welded diagonal inside, which did the trick. It was so simple and worked so well that we quickly tagged it Harmon's rabbit box, because it looked like a rabbit trap.

★ ★ ★

When we reached the 6 x ⅝ flat, we put on one strip repeater, on numbers 13 to 15 stand. This proved much better than the skew-Y tables on long bars. So we now repeat most of the range of flats rolled, and we now roll down to 1½ inches wide. We have had trouble with sizes like 1½ x 1 as they neither want to repeat nor work on skew tables.

★ ★ ★

Our next product was large angles. We started to roll 4 x 4 x ½ using flat and edging method. Other mills use this method, but some still stick to tongue and groove method. We had trouble with the back of the angle due to not being able to set up close enough, also due to pull in the roughing stands. We gave it up and went to 4 x 4 x ¼ which we made very easily. Later, we went back and rolled the ½ inch thickness after learning some tricks.

★ ★ ★

Next size was 3½ x 3½ angles, and then 3 x 3; finally 2½ x 2½, which completed the scheduled range on this mill. The flat and edge method is an easy way to make several thicknesses of angles without having trouble with length of legs. In taking a slab billet and flattening through a continuous roughing train, and then bending it to make an angle requires close adjusting on the part of the rolling crew, as well as extreme care to get speeds of various motors adjusted. I like the flat and edge method for rolling angles, and we use it in our 10-inch mill on smaller sizes. We will soon roll unequal leg angles using this same method.

★ ★ ★

Soon after we had rolled these three products—reinforcing bars, flat bars and angles—it was decided to put on another crew. This brought more headaches because the changes from size to size as well as inexperienced people did not do so well. Inexperienced chargers commenced to tear up the furnace charging machinery. Billets scraped the walls of the furnace, water got off some roll passes, grease did not get to ball thrust units and burned them up. I suppose we should expect these things, but we didn't.

★ ★ ★

Then, as if we were not having enough trouble, it was decided to put on three crews in the 13-inch mill and two crews in the old mill. Everyone had rights in both mills and they ran back and forth and doubled over until they got tired, and laid off from work.

★ ★ ★

So we decided to start rolling rods on the 13-inch mill three shifts in March, 1957. The crews we had had rolled rods on the old mill, where they were not too good. After being split five ways—that is, three crews on the 13-inch mill and two on the old mill—they were spread too thin.

★ ★ ★

To jump from a 14-stand mill using 1½ inch billets to a 21-stand mill using 2½ x 2½ inch billets, fully mechanized, was more than they could do. The speed was a little different in that the old mill finished at 2000 feet per minute and the new one at 5000. We tried to start it off slow, but when you slow down the finishing to 4000 feet per minute, the steel passing through the first five stands is too cold to make it through the finishing train. So we went back up on the speed. Inexperience commenced to show up. Some thrust bearings got in wrong on number 21 stand and wore out and stalled the rolls, breaking two expensive spindles. There was another case in which a reel operator tried to dump before time, or out of time, and wrecked a gear reduction set. Mill scrap from the repeaters got so far ahead of the winder that we had to drag scrap to the outside yard to keep going.

★ ★ ★

At this writing we have had four short rollings on rods, about 1½ weeks each, sandwiched in between merchant products. None of the rollings has been satisfactory so far as production is concerned. However, the rods we rolled—approximately 7000 tons to date—have been extremely close to gage and a very excellent coil.

★ ★ ★

We are not discouraged, although not at all satisfied, and think more experienced people will learn to roll rods on this mill just like any other new mill.

★ ★ ★

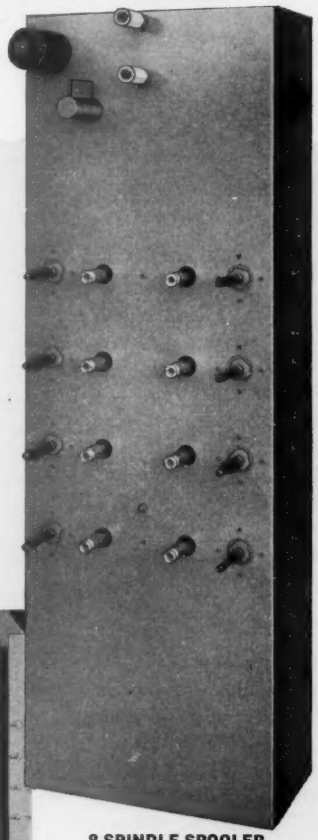
The layout, buildings, motors, equipment and warehouses are ideal for the rolling of these products. Surely our company has provided the necessary mill to compete with our neighbors and supply our trade. It is one of the finest layouts of a combination rod and merchant mill that can be designed and built.

(*Please turn to page* 223)

we design
and build

SPECIAL MACHINES

to suit your special needs



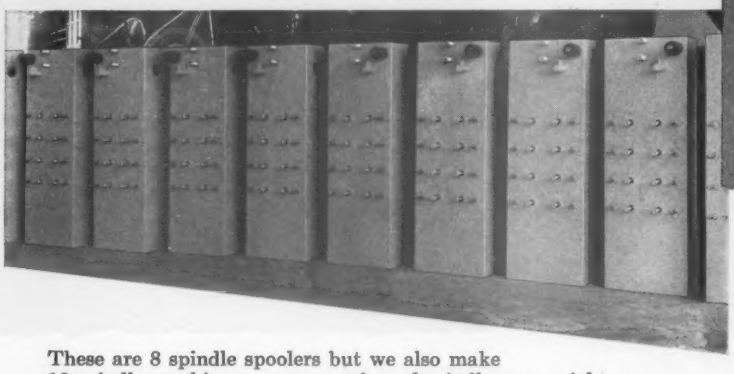
Here's an example...

A customer of ours had a spooling problem involving space limitations for a given number of spindles, and asked us to design a take-up machine conforming to his specifications.

We like that kind of assignment, and our engineers came up with a machine occupying only *two square feet* of floor space, yet offering 8 variable speed, individually motor-driven, torque controlled spindles. That's the machine you see at the right—and we're now filling orders in quantity as you can see in our factory picture below.

Maybe you can use this same machine to advantage, but the main point is that we can design and build just about any special machine you may need to fit a specific purpose . . . either our design, your design or a combination of both.

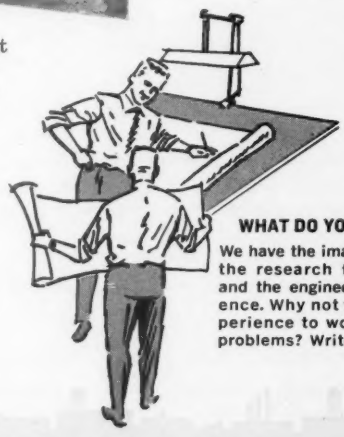
If you have a problem, let's talk it over.



8 SPINDLE SPOOLER

The 8 spindle cabinet spooler shown above is only 24" wide, 12" deep, 72" high.

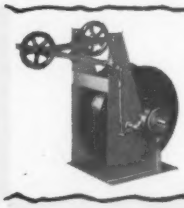
These are 8 spindle spoolers but we also make 16 spindle machines or any number of spindles you might want on a machine. Spindles are individually motor driven by a torque motor (860 rpm) with torque control giving variation from zero to 30 ounce-inches. Traverse mechanism, electrically controlled, is also individually motor driven. Traverse range varies from zero to 4" or 4" to 6". Machine accommodates full range of spools from 2½" head D. to 6" D.



WHAT DO YOU NEED?

We have the imagination . . . the research facilities . . . and the engineering experience. Why not tap that experience to work on your problems? Write or call us.

Another example



LET-OFF STAND

The development of large reel-less packages created the need for an improved Let-off Stand. Our design incorporates an automatic tension-breaking device, plus an easy means of loading and unloading.

ACROMETAL PRODUCTS, INC.

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Effect of 475°C Heat Treatment on Cold Worked 18/8 Stainless Steel Wire

by Samuel Storchheim
President and Technical Director
Metals Research and Development, Inc.
Exeter, Pennsylvania

The author points out that since carbide precipitation has been investigated and reported upon, in this article he has discussed the effects on properties other than common resistance. The article is one of a series he has written for Wire and Wire Products in the last several years covering various phases of stainless steel wire processing.

In the course of working with stainless steels of the 302 and 304 types, the effect of the carbide precipitation phenomenon has been investigated thoroughly by numerous groups. The temperature range where this particular phenomenon occurs is 400-900°C (750-1650°F). Primarily, the particular effect of carbide precipitation which has been investigated to the greatest extent has been change in corrosion resistance. Invariably, corrosion resistance is definitely impaired, the causes for this being as noted in the following paragraphs.

★ ★ ★

At the precipitating temperature, carbon precipitates out of the matrix and forms the carbide Cr_4C. This, in turn, depletes the surrounding areas of chrome and in turn reduces the corrosion resistance of the areas. Once this has happened, severe attack by relatively mild corrosive media progresses rapidly along the areas depleted in chrome. Normally, depletion occurs around the grain boundaries; that is, the carbides are precipitated at the grain boundaries.

★ ★ ★

The following report concerns an investigation into properties other than corrosion resistance of stainless steel after it has been heat treated in the carbide precipitation range. Work performed for these experiments was done at 475°C (885°F). The material used was commercial 18/8 stainless steel available in wire form, see Table I for analyses. The wires were severely cold worked, in the order of 98% reduction in area. That is, they were drawn from 0.028 to 0.004 inches in diameter. The wires were tested in the as drawn condition and also after being heat treated.

★ ★ ★

One of the interesting points which came out of this investigation was that precipitation was effected in seconds whereas we normally think of commercial precipitation treatments being conducted for minimum times of minutes and usually hours. In the particular case under discussion, the wires were strand heat treated through a furnace such that they were at temperature for 2 seconds. A dissociated ammonia atmosphere was run through the furnace causing the wire to emerge clean and bright. It should be pointed out that during the heat treatment, the wires were definitely stress relieved. Evidence to support this was that a tight curl associated with the drawn wire opened-up after the heat treatment. The heat treatment incidentally was below that required for phase change, normally about 595-650°C (1100-1200°F) (1, 2). Thus, two phenomena were working simultaneously during these tests. One was carbide precipitation, the other stress relief.

★ ★ ★

The object of this study was to determine the effect of carbon content upon the precipitation phenomenon and see how this carbon content in turn affected: the specific electrical resistance, the ultimate tensile strength, the magnetic remanence, and the magnetic coercive force of stainless steel. The techniques for measuring these particular properties have been described adequately in the literature and may be found in the references at the end of this article. All the data that were obtained are presented (see Table II); however, the information concerning coercive force is not considered reliable in that the changes that occurred were ap-

TABLE I

CHEMICAL ANALYSES OF ALLOYS IN PERCENTAGES

No.	C	Ni	Cr	Si	S	P	Mn
1	0.063	8.77	19.71	0.43	0.024	0.030	1.08
2	0.070	8.47	18.90	0.40	0.018	0.030	1.07
3	0.103	8.93	17.49	0.25	0.034	0.028	0.88
4	0.106	9.07	18.73	0.61	0.018	0.029	1.00
5	0.120	8.88	18.07	0.33	0.030	0.030	0.81

TABLE II

PROPERTIES BEFORE AND AFTER PRECIPITATION (2 seconds at 475°C (885°F)

Analysis No.	C, %	Specific Resistance, ohm-cm/ft. Before	After	Ult.Ten.St., psi x 10³ Before	After	Remanence, Gausses Before	After	Coercive Force, Oersteds Before	After
1	0.063	572	604	426	421	5250	7320	40	50
2	0.070	587	578	412	425	5900	7200	60	60
3	0.103	532	513	420	445	7320	8000	100	110
4	0.106	522	500	420	444	6650	7320	130	120
5	0.120	550	525	420	448	6500	7000	120	120

proximately within the limit of error of the analyzing equipment. The data are given the reader to give him some idea of the magnitude of the coercive forces involved. The actual changes in properties in percent caused by heat treatment were used to determine the effect of carbon, see Table III. It was felt that this gave a more fundamental basis for studying the changes that did occur rather than actual property values.

TABLE III

CHANGES IN PROPERTIES, IN PERCENT, CAUSED BY PRECIPITATION

No.	C, %	Sp. Res.,	Ult. Ten. St.,	Rem.,	Coer. For.
1	0.063	+5.58	-1.17	+39.5	+25.0
2	0.070	-1.53	+3.18	+22.0	0
3	0.105	-3.57	+5.98	+ 9.3	+10
4	0.106	-4.24	+5.75	+10.0	- 7.8
5	0.120	-4.55	+6.70	+7.7	0

Results and Discussion

Figure 1 is a plot of the carbon percent versus the change in electrical resistivity also in per cent. It is seen there is a very rapid decrease in resistivity with increasing carbon percent; at approximately 7 to 8 points carbon, the curve levels off considerably. It is interesting to note that the change in electrical resistivity appears to traverse first a positive change and then with increasing carbon content a negative change; that is, with low carbon content containing stainless steels, the heat treatment causes the electrical resistivity to increase. As the carbon content is raised, the change in electrical resistivity goes through zero and eventually starts to decrease. It is felt that the initial increase may be attributed to the stress relief phenomenon while the decrease comes about through actual carbide precipitation.

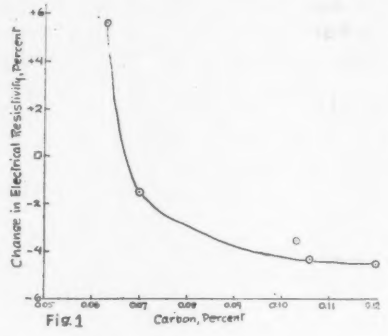

Fig. 1

★ ★ ★

Figure 2 is a plot of the percent carbon versus change in ultimate tensile strength, again in percent. For this particular case it is seen that the strength of the stainless increases quite sharply with increasing carbon content and then at approximately 7 points carbon the rate of increase in tensile strength decreases. It is also observed in this curve that the change moves from a negative to a positive change, that is, with low carbon content stainless steels the tensile strength change is negative, probably the stress relief effect being again, more pronounced than that of precipitation. As the carbon content increases, tensile strength increases such that with increasing carbon content the change is positive. Here the carbide precipitation effect is greater than that of stress relief.

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Figure 3 depicts the effects of increasing carbon content on the percent change in magnetic remanence, Br. Here, we see the most drastic change taking place among all the properties investigated. The change indicates that with increasing carbon percent, the Br decreases very rapidly. The velocity of decrease diminishes, however, with increasing carbon contents at approximately 7 points. There is no indication of a negative change; that is, all changes are positive ranging from a high of 39% to a low of approximately 7%, for about 6 to 12 points carbon, respectively.

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It was stated before that the coercive force data was not considered too accurate and, therefore, no plot was made of the information obtained. However, there is an indication that coercive force decreases with increasing carbon content after heat treatment in the carbide precipitation range. The effects of heat treatment in the carbide precipitation and stress relief range on the electrical, magnetic and mechanical properties of 302 and 304 stainless steels show that decided changes can be expected to take place. Interestingly, the changes can be from positive to negative or vice versa for several of the properties studied,

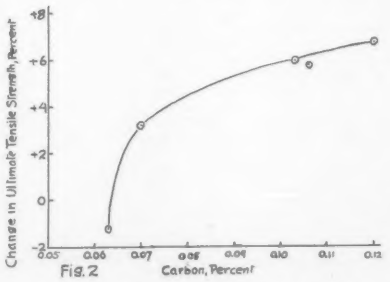

Fig. 2

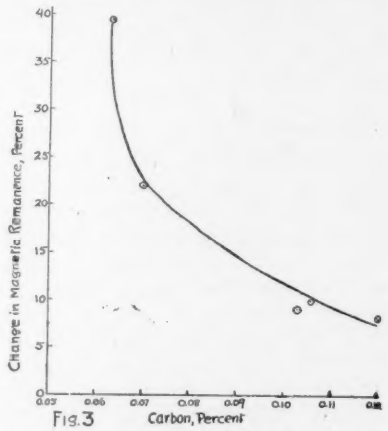

Fig. 3

depending upon the carbon content, usually the change over occurs at about 6 to 7 points carbon. It appears that the stress relief phenomenon is the governing one below this carbon content while carbide precipitation predominates above this content.

★ ★ ★

The changes involved are of considerable magnitude. The actual maximum change among the values determined, in percent, for specific resistance was over 10; for ultimate tensile strength, al-

(*Please turn to page 222*)

New Developments in Hi-Fax Coverings for Wire and Cable

by

W. P. Acton

and

W. O. Bracken

Hercules Powder Company

Cellulose Products Department

Wilmington, Delaware

This paper was presented at The Sixth Annual Wire and Cable Symposium of the Signal Corps in Asbury Park, N. J., on December 4, 1957. It is in the nature of a progress report on this interesting insulating resin, a paper on the same subject having been given at the 1956 meeting. In it, the authors show that it has been possible to develop a high density polyethylene that is resistant to thermal embrittlement and stress cracking.

At last year's symposium a paper was presented on indicated uses of Hi-fax for wire and cable*. In this paper was discussed the chemical nature and physical properties of Hi-fax, our high density polyethylene. At that time it was indicated that the unique properties of high density polyethylene would be of considerable interest to wire and cable manufacturers. This interest has developed in the past year and it seems certain that this new coating resin will play an important role in wire and cable applications.

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However, it is not sufficient to describe this new insulating material as "high density polyethylene" as this description is too broad. For instance, the type of high density polyethylene which is suitable for large injection molded items or for coating paper does not have the properties required for wire insulation. In some of the early attempts to use high density polyethylene as wire insulation, it was found that the material had very poor resistance to stress cracking and to thermal embrittlement. Both of these properties have been found to be strongly dependent on molecular weight as well as density. For example, it can be shown that through the proper choice of polymer it is possible to achieve a high degree of resistance to environmental stress cracking and to thermal shock while retaining the desired characteristics of processability and toughness.

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First, let us consider environmental stress cracking. As you all know, the first attempt to use low density polyethylene as a cable sheath almost ended in disaster as the sheaths stressed in contact with a soap solution cracked in a few months' time. However, by using a higher molecular weight resin, stress cracking was prevented.

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The test method generally used to evaluate stress-crack resistance was developed by the **Bell Telephone Laboratories.** This test has been under consideration by the ASTM as a "proposed method of test." The subcommittee reported[1] that reproducibility between laboratories is unsatisfactory, probably because of the critical nature of the sample preparation. However, we have been able to obtain fairly reproducible results within our own laboratory.

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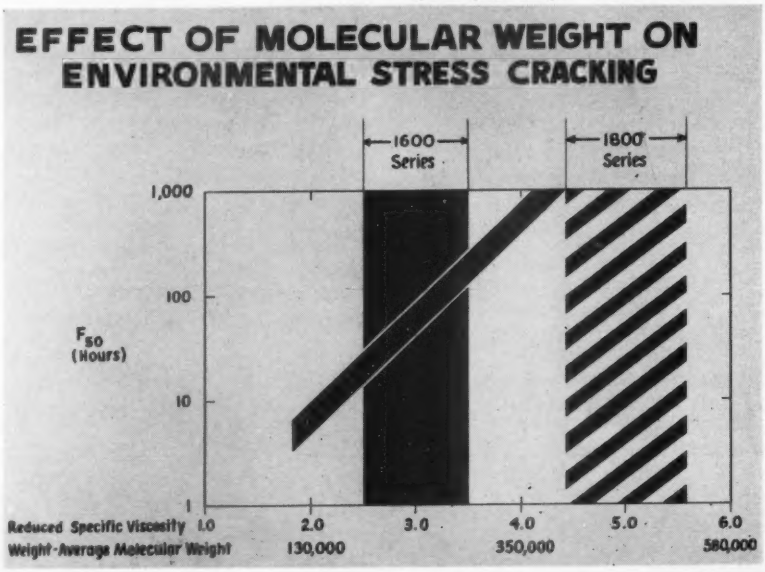
Briefly, the test procedure is as follows: a ½" x 1½" strip is cut from a compression molded sheet 0.125" thick. After annealing, conditioning, and slitting, ten strips are bent and placed in a brass jig



* "Hi-fax Potentials in the Wire and Cable Industry" by J. B. Martin, W. O. Bracken and E. W. Cronin, Hercules Powder Company, Wilmington, Delaware.

[1] ASTM Committee D-20 on Plastics, Subcommittee XV, Section 5, ASTM Bull. No. 218, 25 (Dec. 1956); Kaufman, Modern Plastics 34, No. 6, 146 (Feb. 1957).

having an inside width of 0.463. The assembly is placed in a test tube, filled with Igepal CO-630 and put in a 50°C. bath. The time at which half of the specimens fail is the stress-cracking time.

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The stress-crack resistance of low molecular weight polyethylene is known to increase with increasing molecular weight (decreasing melt index) and the same is true for high density polyethylene. Figure 1 shows the relationship between weight average molecular weight of Hi-fax and stress-crack resistance. Two series of Hi-fax supplied to the wire and cable industry are superimposed on the graph. The time to failure of 1-2 melt index low molecular weight polyethylene is in the order of 10-50 hours. You will note that 1600 series Hi-fax has about the same, or somewhat better stress-crack resistance. Neither the low molecular weight low density polyethylene nor 1600 Hi-fax are recommended for use in applications requiring extreme stress-crack resistance.

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On the other hand, both high molecular weight low density polyethylene (melt index 0.3) and 1800 series Hi-fax have excellent stress-crack resistance. Reference to Figure 1 will show that the 1800 type Hi-fax will pass more than 1,000 hours in the Bell Laboratories test.

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One of the alleged shortcomings of high density polyethylene which has been highly publicized is its poor resistance to heat shock. By heat shock, I am referring to ASTM, D-734-50T relating to vinyl wire coatings. In this test, a wire of AWG (gage 8 or smaller) is wrapped around its own diameter and exposed to 120°C. for one hour. If no cracks develop, the sample passes the test. Some early exposures of high density polyethylenes to these conditions resulted in severe cracking. It was very easy at that time to consider this "heat cracking" as a unique property of high density polyethylenes. However, it has been reported that thermal embrittlement varies with melt index and occurs with all types of polyethylene.

★ ★ ★

At the 1957 winter meeting of A.I.E.E., Messrs. Cary, Snyder and Vakos read a paper on "The Thermal Embrittlement of the More Crystalline Polyethylenes"*. These authors reported that heat cracking was not unique to high density polyethylenes, but also occurs with the low density resins. At a given density, the resistance to heat cracking improves with decreasing melt index. However, if melt index remains constant, the heat-crack resistance becomes worse as the density increases. For instance, the authors report that to obtain heat-crack resistance equivalent to an 0.92 density resin of 1-2 melt index, a melt index of 0.25-0.70 is required for 0.95 density and 0.03-0.12 melt index is required for 0.96 density polyethylene.

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Hi-fax has a density of 0.945. The 1600 series Hi-fax supplied for wire coating has a melt index of 0.1-0.2. This falls below the minimum of 0.25 suggested by authors Cary, Snyder and Vakos. Theoretically, then, 1600 series Hi-fax is equivalent to or better than low density polyethylene having a melt index of 1-2.

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Theory is fine, but actual test results are needed. Our tests on thermal embrittlement are still continuing, but the data collected thus far substantiate the theory. Tests were discontinued on number 14 wire with 1/32" coating of black Hi-fax 1600 series after 400 hours' exposure at 110°C. in a dry oven and after 1,000 hours' exposure in 90°C. water with no failures in either case. A number of samples of number 14 wire coated with 1600 series Hi-fax, both black and natural, have passed 700 hours in 90°C water and 90°C. air.** Number 22 wire, coated with 10 mils of natural 1600 series Hi-fax was aged twelve months at 50-55°C. with no sign of cracking.

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On the other hand, number 22 wire coated with 10 mils of an 0.96 density resin having a melt index of 0.5 showed cracks on storage at room temperature for three months. This example serves to emphasize that the proper type of "high density polyethylene" be used for wire coating.

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Of course, the conditions under which accelerated tests are performed (90°C.-100°C.) are far more severe than would be encountered in service. Continuous exposure at temperatures above 70°C. is not recommended for either high density polyethylene or low density polyethylene because of their susceptibility to oxidation.

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At the present time, we are supplying two types of Hi-fax to the wire and cable industry. The 1600 type is recommended for use in all applications not requiring the ultimate in stress-crack resistance. This type has moderate stress-crack resistance, somewhat better than the stress-crack resistance of 1-2 melt index low molecular weight polyethylene which has found wide acceptance in this market.

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The heat-shock resistance of 1600 Hi-fax at normal operating temperatures is at least comparable to the heat-shock resistance of 1-2 melt index low density polyethylene. Extended exposure to high temperatures is not recommended for either low density polyethylene or Hi-fax because of the susceptibility to oxidation. However, even at 90°C., the heat-shock resistance of 1600 type Hi-fax is very good.

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Our experience with production rates of 1600 Hi-fax has been inconsistent. The output varies with the equipment and type of wire produced. Using equipment de-

(*Please turn to page* 220)

* Reprinted in "Wire & Wire Porducts," 32 No. 9:998 (Sept. 1957).

**Since this paper was presented, the black samples have passed 2000 hrs. without failure in both 90°C air and 90°C water. The natural samples failed about 750 hours in 90°C water; have passed 2000 hours at 90°C in air without failure.

"Preformed" Wire Products

by Howard F. Stirn
Senior Engineer
Preformed Line Products Company
Cleveland, Ohio

In this article the author describes a wire product that has been gaining wide acceptance in the last few years, a development of his company.

Introduction

"Preformed"* wire products refers to wire that has been machine formed (Figure 1) into a helical configuration and which is the basic component of assemblies (some of which are subjected to further fabrication) for the gripping, repairing, armoring, and splicing of conductor, guy strand, and in general, almost all types and makes of cable, both circular and non-circular, bare and insulated. Figure 2 illustrates the helically formed wire which is basic to all of the products.

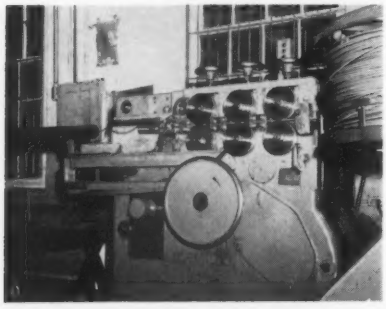

Figure 1—Equipment with which wire is formed into specified helix.

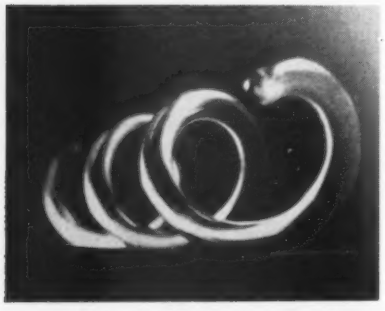

Figure 2—Basic helical shape of "Preformed" wire.

This paper was written for two very broad reasons: 1) to introduce one of the many newly developed uses for wire, and 2) to present to the wire industry a few of the unique physical and electrical properties desired in the various types of wire utilized in the manufacture of these Preformed products.

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The main portion of the discussion presented herein, therefore, is devoted to the unique combination of properties of the ferrous and non-ferrous wire from which these special fittings are made. Nearly ten years experience has been accumulated in the use of these basic devices, and the scope of their use has steadily and rapidly increased throughout this country and abroad.

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Figure 3 illustrates the tremendous growth in the annual consumption of all types of wire being employed in the manufacture of Preformed products. Figures 4, 5, 6, and 7 illustrate how the formed wire is utilized in Guy Grip* dead-ends, armor rods for transmission and distribution lines, tangent supports (neoprene coated) for telephone wire and splices for prestressed concrete strand. These fittings are just a few of the many Preformed products, each of which is designed for the particular type and size of cable on which it is to be employed. Application is easily

Figure 3—Annual wire consumption for "Preformed" products.

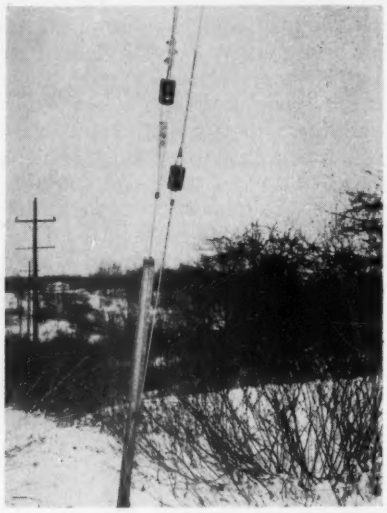

Figure 4—Relative appearance of the "Preformed Guy Grip" dead-end versus a 3-bolt clamp.

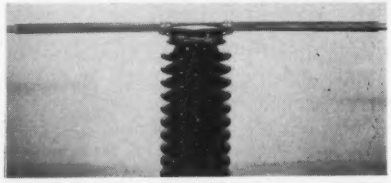

Figure 5—Armoring at a typical, transmission type insulator.

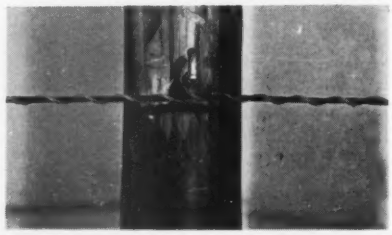

Figure 6—Neoprene-coated, telephone-wire tangent support.

* A proprietary trade name of Preformed Line Products Company.

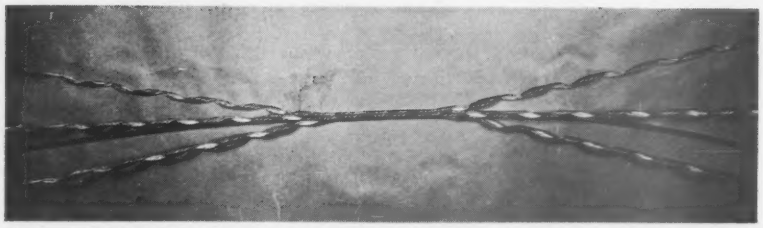

Figure 7—Full-strength splices for prestressed concrete strand. * * * * * * *

accomplished by wrapping the helical rods around the cable without the use of tools.

Increasing Use of "Preformed" Products

Preformed products have gained increasing usage with line crews, repairmen, and electrical and mechanical contractors. Their popularity may be attributed not only to substantial cost savings due to ease of application, accompanied by the elimination of extensive training of field crews in application techniques, but also the many safety features which are inherent in their design and construction.

Research and Testing

Exacting performance and safety requirements have necessitated the design and installation of special laboratory equipment to investigate all Preformed products under nearly every conceivable condition to which they might be exposed in field service. These conditions include static, dynamic, and long term sustained tensile loading; simulated aeolian vibration of electrical conductors and associated hardware; corrosion; high current heat cycling; etc.

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As a direct result of thorough testing, constant research, and precision manufacturing, these Preformed products exhibit characteristics which combine maximum holding power and efficiency with safety, economy, and ease of installation.

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Since many types of wire are regularly employed, such as: bright steel, galvanized and aluminized steel, copperweld, commercial bronze, cadmium copper, phosphor bronze, types 430, 302, and 316 stainless steel, aluminum alloy 6061-T91, etc.; the physical and electrical characteristics of each must be evaluated and carefully considered before issuing a product design. The range of wire sizes normally used varies from approximately .045″ to .500″ in diameter.

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It has become more and more apparent that an unusual combination of properties is required of the many types of wire utilized, because of the field service requirements established for Preformed wire products. This combination is referred to as being unusual because it is believed that all the desired properties are rarely found in any one particular alloy.

Design Problems

The design problems are often quite difficult, for naturally one is striving continually to improve the product without increasing its manufacturing cost. Better raw materials, therefore, are a primary consideration in product improvement.

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The design of these products might be discussed briefly to illustrate the nature of the qualities desired in a metal, although at first glance it may appear to be a rather simple matter since the helically formed wire is the basis of all products. Design of Guy Grip dead-ends, which are the end fixtures or terminals for galvanized steel guy strand, is a relatively simple problem compared to the design of other products. Not only must the wire size chosen have enough total strength in the loop, but it must also have a proper relation to the strand diameter, in order to provide the easiest application to the guy strand. Other design parameters, such as overall length and pitch length or lay, are evaluated through constant testing, but will not be discussed at this time.

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The design of splices is a far greater problem, in that all of the previous is true with the additional requirement of providing an equal or lower electrical resistance than the cable being spliced. This electrical characteristic together with the required tensile strength, is one of the most important aspects to be considered in selecting raw materials. A discussion of the problems that arise in selecting a type of non-ferrous wire for splices to be used on copper conductors of all sizes will clearly illustrate its nature.

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One must realize that it is quite difficult at times to define accurately what exact test requirements a wire should meet. However, there are in general certain qualities and properties desired.

Desired Properties

Only the design of Preformed splices for copper conductors will be considered at this time.

A) High Electrical Conductivity

To design a splice with 100% of both the rated strength and relative conductivity of the copper conductor under consideration, it would be necessary to utilize a material, in wire form, possessing the tensile strength of hard-drawn copper together with an equivalent electrical conductivity. In addition, it would also be necessary for the cross-sectional area of the splice to be equivalent to that of the conductor. By employing a wire with a lower percent of conductivity and the same tensile strength as outlined above, there will be more design strength than is actually required, since a much larger relative splice-to-conductor cross-sectional area ratio must be utilized to obtain the desired 100% relative conductivity. Thus, as the electrical conductivity of the alloys under consideration decreases, assuming the strength remains constant, the wire diameter must in-

crease, in order to maintain the desired 100% relative electrical conductivity. However, selection of a larger wire diameter causes the splice-to-conductor strength ratio to climb steadily.

B) Good Thermal Conductivity

Adequate thermal conductivity is required to insure that the splice will remain as cool as possible under the existing operating conditions. On the whole, this property is not necessarily critical; however, this factor could become very important under certain unusual design conditions.

C) Spring Temper with a High Elastic Limit and Tensile Strength

These properties are required to prevent permanent deformation of the splice wires when applying the Preformed splice to the conductor. If any such deformation does occur, the efficiency of the splice may be impaired.

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The degree of bending that can be tolerated is a function of wire gage, temper, and the minimum radius of bend experienced during the splice application.

D) Good All-Around Atmospheric Corrosion Resistance and Good Resistance to Stress Corrosion

These two requirements are self-explanatory. The copper alloy splice being considered or any of the Preformed products, will at some time or other be exposed to almost every conceivable type of highly corrosive environment encountered outdoors in the United States. Fortunately this has never been a problem, for these fittings have been found, by proper choice of raw material, to outlast the cable or conductor to which they have been applied. These two desirable properties perhaps lead to another very important one—compatibility of two dissimilar metals.

E) Compatibility with Electrolytic Copper

Naturally this is a very strict requirement, and pertains not only to this one example to which splices for copper conductors are being discussed, but also where aluminum, stainless steel, or other possible metals are being employed.

F) Minimum Notch Sensitivity

When an electrical conductor or perhaps a steel strand has relatively greater surface hardness than the metal of the helically-formed splice, the notch sensitivity of the splice-wire material, at the butted section of the two ends to be joined, is very important. This was found to be the case particularly in preliminary designs of splices for prestressed concrete strand. The notching of the splice wires occurred during the application, and subsequent failure of the splice at this point could very easily have been serious if the wrong choice of materials had been made.

G) Good Fatigue Properties

By fatigue is meant, in this discussion, those types of failures that occur from the reversed bending stresses encountered through aeolian vibration of a transmission line, as well as cyclic tensile stresses resulting from repeated, mild, or even extreme changes in tension of the cable. Naturally, as previously mentioned, all of these properties are relative; with it being impossible to define any precise requirements at this time. Tests are being conducted on copper conductors and helically-formed wire splice specimens at present, in order to plot curves of cycles-to-failure versus stress for all the copper alloys found to be satisfactory in other respects. It is obvious that the minimum criterion for fatigue life of a splice, under testing to failure, is that it is greater than that of the conductor itself.

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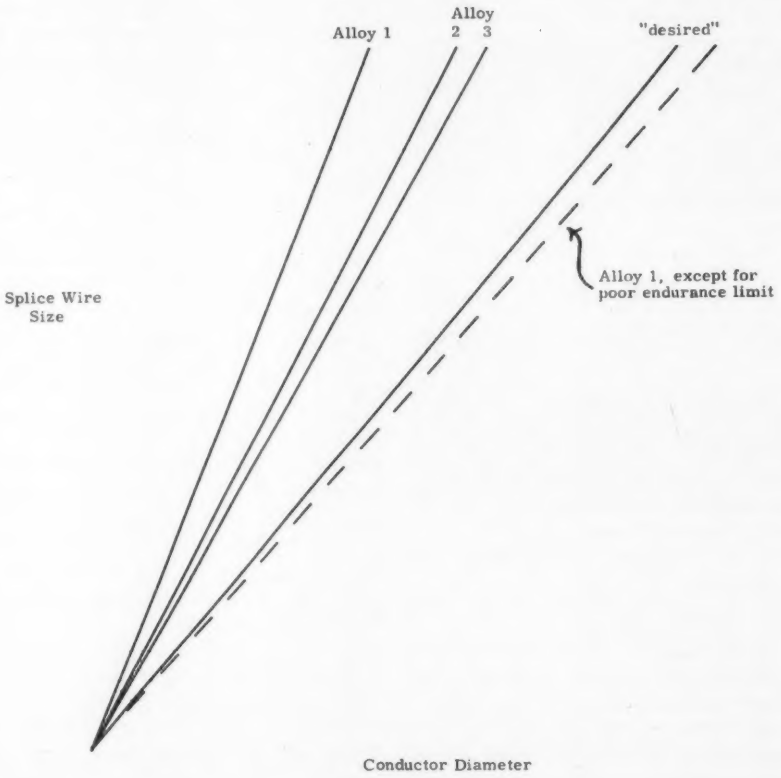
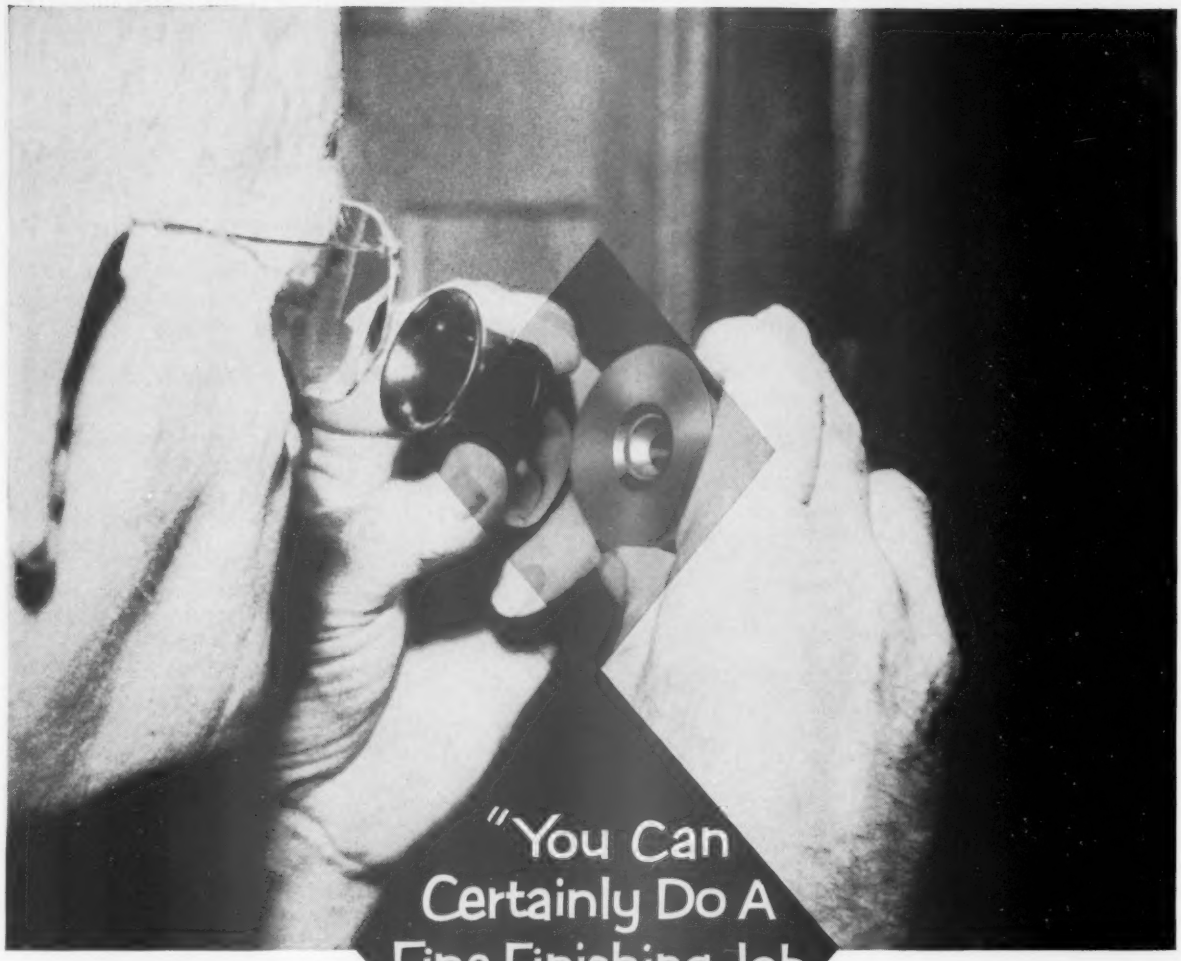


Figure 8—"Preformed" copper-alloy splices for copper conductors. * * * * * *



ELGIN DIAMOND"

Says ***Tom Mitchell,*** *Foreman of The Die Room,*
LACLEDE STEEL CO., ST. LOUIS, MO.

Dies like the one Mr. Mitchell is inspecting are kept busy drawing some 7 Billion feet of high quality steel wire a year. Their surfaces must have a perfect finish, and must be quickly restored during maintenance with fast-cutting diamond abrasives so they can go back to work without delay. That's why Laclede uses Elgin Dymo-C*. It has no oversized particles to scratch, no "fines" to slow down polishing. More and more steel companies are discovering that ready-to-use Elgin Dymo-C* does a better finishing job, faster, and at less cost. Write for a free demonstration by an Elgin Field Engineer today.

*C for Carbide

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ELGIN NATIONAL
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Division
WATCH COMPANY
ILLINOIS

Meetings Scheduled for 1958 By THE WIRE ASSOCIATION

These are your meetings, Mr. Wire Man, and you are cordially invited to attend and profit by them.

REGIONAL MEETING: Buffalo, N. Y., May 1 and 2 at the Statler Hotel.

Fred A. Webber, Chief Metallurgist, Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., is the General Chairman for this meeting.

The chairman of the Electric Wire and Cable Section for this meeting is W. R. Moyers, Chief, Wire Engineering Dept., Western Electric Co., Buffalo, N. Y.

Plant inspection tours of the Wickwire Spencer Wire Mill for the Ferrous Division and of Western Electric Company's Wire and Cable Plant for the Non-Ferrous Division, have been arranged.

REGIONAL MEETING: Los Angeles, Calif., June 5 and 6, at the Statler Hotel.

The program includes plant inspection tours and technical sessions, details to be announced later.

Joseph F. Conlan, President of the City Iron and Wire Works, Los Angeles, is the General Chairman for this meeting.

ANNUAL CONVENTION: Atlantic City, N. J., October 13-16, at Hotel Haddon Hall.

General Program Chairman will be Raymond S. Worth, Manufacturing Manager, Wire Mills Division, John A. Roebling's Sons Corp., Trenton, N. J. Chairmen of the Program Committees for the Convention will be:

Ferrous Division Chairman: Dartrey Lewis, Chief Engineer, Research and Development, John A. Roebling's Sons Corp., Trenton, N. J.

Non-Ferrous Division Chairman: Hugo W. Biskeborn, Director of Manufacturing, Ansonia Wire & Cable Co., Ashton, R. I.

Electric Wire & Cable Section Chairman: C. C. Lawson, Plant Facilities Engineer, Bell Telephone Laboratories, Inc., Murray Hill, N. J.

Plant visits to Roebling's Steel Wire Mills and Electric Wire and Cable plants will be made.

Papers delivered at these meetings will be prepared and presented principally by production men in the mills.

You are cordially invited to attend any or all of these meetings. You can broaden your contacts and exchange ideas on your own problems through personal meetings with others—as well as secure valuable information from the technical papers and the discussions that follow them.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONNECTICUT**

Regional Meeting

THE WIRE ASSOCIATION

The Time: May 1 and 2, 1958

The Place: Statler Hotel, Buffalo, N. Y.

General Program Chairman

FRED A. WEBBER, Chief Metallurgist
Wickwire Spencer Steel Div.
Colorado Fuel and Iron Corp.
Buffalo, N. Y.

Ferrous Program Committee

WILLIAM R. COOK, Wire Mill Supt.
Wickwire Spencer Steel Div.
Colorado Fuel & Iron Corp.
Buffalo, N. Y.

FREDERICK C. THOMPSON
Stainless Steel Service Engineer
Allegheny Ludlum Steel Corp.
Dunkirk, N. Y.

CHARLES REARDON, Sales Mgr.
Madison Wire Company
Buffalo, N. Y.

Non-Ferrous Program Committee

W. R. MOYERS, Chief of
Wire Engineering Department
Western Electric Company
Buffalo, N. Y.

WILLIAM G. MILLER, Manager of
Copper Wire Department
Westinghouse Electric Corp.
Buffalo, N. Y.

ARTHUR J. POPKIN, President
Paragon Wire & Cable Company
Buffalo, N. Y.

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Technical session programs for both the Ferrous and Non-Ferrous Divisions of the Association will feature papers on timely topics of interest to our members who are interested in production problems faced by mill men.

The Non-Ferrous papers will be in the main on subjects relating to electric wire and cable. All papers are designed for the production men.

Besides a banquet on Thursday evening, there will be two plant inspection tours on Friday. Ferrous men may visit the Wickwire Spencer Steel wire mill, in which a large amount of new equipment has gone into operation in the last year or so, including a new electronically controlled rod mill and a new welded wire fabric plant.

Non-Ferrous wire men will be taken to the Buffalo plant of Western Electric Company, a well-equipped plant that we have not heretofore included in our program at previous meetings in Buffalo.

Full program details will be announced at a later date, but you may be sure now that by planning to attend this meeting, you will be well-rewarded.

Watch for further announcements.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 Main Street **Stamford, Conn.**

The Effect of Stock Temperature on the Physical Properties of Polythene Coatings for Wire

by J. A. Durno
Technical Service Representative
Plastics Division
Canadian Industries Limited
New Toronto, Ontario, Canada

The study was designed to determine the effects of compound stock temperature, as measured at the die, on the physical properties of the resultant conductor coating.
The author delivered this paper at the Signal Corps 6th Annual Wire and Cable Symposium at Asbury Park, N. J., on December 4, 1957.

Introduction

One of the many factors to be considered during the extrusion coating of wire, is the stock temperature of the extrudate at the point where it comes into contact with the conductor.

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The effect on the physical properties of the resulting conductor coating of a range of stock temperatures has been determined for low density polythene.

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It is the purpose of this paper to present the findings obtained, with emphasis being placed on the ultimate tensile strength and elongation at break of the extruded coating.

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In this study, stock temperature was measured with a hand pyrometer, the needle of which was immersed in the melt about half an inch from the end of the cross-head insert.

Summary

It has been found that the ultimate tensile strength and elongation at break of low density polythene coatings on wire are very dependent upon the stock temperature which the extrudate has attained by the time it has come into contact with the moving conductor.

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The general trend of improving tensile properties with increasing stock temperature has been observed for polythenes varying in melt index from about 0.4 to about 7.00, for aged and unaged samples and for several cross-head insert designs.

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The majority of the testing was carried out with compounds of nominal melt index 2.0 containing 2.5% channel black with average particle size of 18 mu and 0.2% di beta naphthyl para phenylene diamine antioxidant as this type of compound is most commonly used for linewire insulation. With this compound, the tensile properties of the insulation were found to become sufficiently high at a stock temperature above 430° F to comply with the tensile requirements outlined in the Canadian Standards Association and Insulated Power Cable Engineers Association weather-proof wire insulation specification when a standard type of insert was used.

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A number of cross-head inserts of varying design were evaluated and the general trend of improving tensile properties with increasing stock temperatures was observed for each one. It was also noted that one of the insert designs improved tensile properties of the polythene coating so that the tensile specifications referred to were met at a relatively lower stock temperature than was necessary when other inserts were used.

Field trials held to date on commercial extrusion equipment show that the results obtained in this laboratory evaluation are valid and are not limited to smaller conductors.

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The results obtained on weather-proof wire insulation, are applicable to other wires and cables whose construction includes polythene insulation or jackets.

Procedure

The results quoted in this paper were obtained with a 2½ inch diameter, electrically heated, single screw, extruder using No. 14 AWG solid copper conductor coated to a finished outside diameter of 0.1265 inches. A metering-type screw of 15:1 length to diameter ratio and screen pack of 1-20 mesh, 1-40 mesh and 1-60 mesh screens were used. The exit temperature of the screw cooling water was held at 120° F. For the most part, the wire speed was held constant at 200 ft. per minute. A few tests were however run with the conductor moving at higher speeds to determine whether the trends observed at lower speeds would hold good. The compound used in this work consisted of melt index 2.0 polythene plus 2.5% channel black of average particle diameter 18 mu and 0.2% di beta naphthyl para phenylene diamine.

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Although pre-drying of polythene compounds containing fine particle sized channel black is advisable, no such procedure was employed during this evaluation as

it was desired to maintain stringent extrusion conditions. For the same reason, no attempts were made to pre-heat the conductor, although it is known that such pre-heating yields considerable improvement in tensile properties of extruded polythene coatings.

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A number of cross-head inserts were used in order to determine:

1. **Whether the general trends observed with one type of insert would be applicable to one of a different design.**
2. **Whether an insert design could be found with which polythene weatherproof wire insulation extruded at a relatively low stock temperature would meet the required tensile specifications.**

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The table below lists the critical dimensions of the inserts used:

INSERT NO.	ORIFICE DIAMETER IN.	ORIFICE DRAW-DOWN %	PARALLEL LAND IN	FLOW TAPER	LEAD-IN	L/D RATIO	REMARKS
1	0.1265	0	0.250	3.5	30	1.97:1	
2	0.1686	25	0.250	0	30	1.47:1	Short Insert
3	0.1686	25	0.250	3.5	30	1.47:1	
4	0.1406	10	0.984	0	30	7:1	Long Land
5	0.1406	10	0.250	7.5	30	1.77:1	
6	0.1406	10	0.250	5.0	30	1.77:1	

Since this study had been prompted by difficulties experienced by wire and cable manufacturers not possessing wire preheating equipment in meeting the tensile requirements of weatherproof wire specifications, physical testing was confined to measurement of the tensile properties of the insulation. Tensile tests were carried out on a constant rate of elongation type tester with the lower jaw set to travel at 20 inches per minute.

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Aging tests as outlined in C.S.A. Approvals Bulletin No. 313 and I.P.C.E.A. Standards S-19-81 Part 8, were also performed to determine the effect of stock temperature on the tensile properties of samples which had been exposed to accelerated aging.

★ ★ ★

Tests are now in progress to determine the effect of stock temperature on the tensile properties of samples exposed to unaccelerated aging.

★ ★ ★

For the purpose of this study, stock temperatures were obtained with a hand pyrometer by immersing the needle into the melt as it was extruded from the die. Attempts were made to obtain the readings about ½ inch from the end of the cross-head insert.

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A permanent thermocouple had been installed at the breaker plate so that stock temperature measurements could be obtained at this point. This thermocouple, which had an outside diameter of 0.040 inches, projected into the melt about 2 inches downstream from the breaker plate and was connected to a temperature indicator so that a continuous reading was obtainable. The thermocouple proved to be particularly useful in determining when stable extrusion conditions had been attained.

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Extrusion coating was carried out, generally at wire speeds of 200 ft. per minute, with the coated wire outside diameter target being 0.1265 inches. When these conditions had been met, the coating process was continued for 5 minutes.

★ ★ ★

At the end of the coating period the wire was stopped and a second stock temperature measurement was obtained at the die. The first and second stock temperatures generally were the same which would indicate that stable extrusion conditions had been attained. If the two readings did not agree, the extruder was allowed to run until a steady state had been reached and then a second sample was obtained with the first being discarded.

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Tensile tests were not performed on the samples until 24 hours after they had been obtained. Exploratory tests were conducted on samples as soon as two hours after extrusion and the results obtained here showed satisfactory agreement with those obtained 24 hours later but it was felt that the latter procedure would yield more reliable results.

Results

If the C.S.A. Approvals Bulletin

FIG. 1

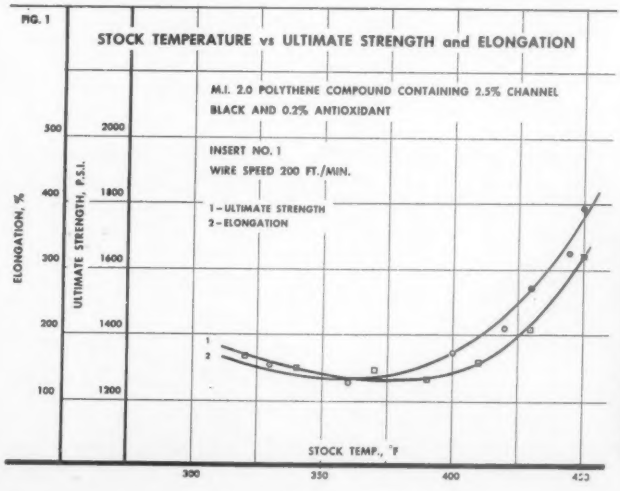
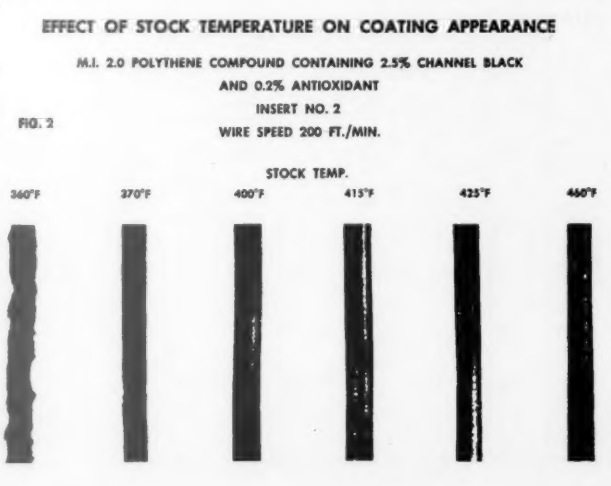


FIG. 2



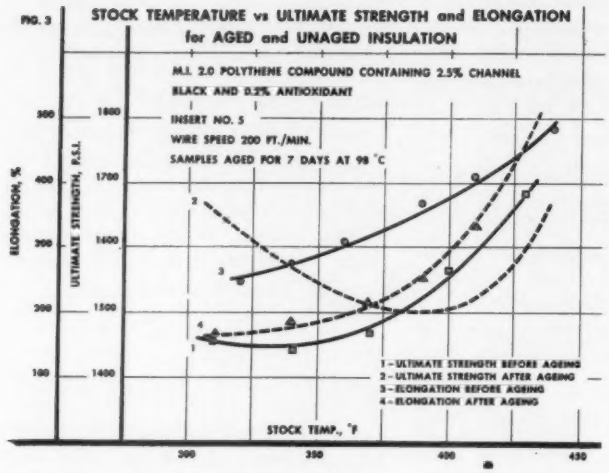
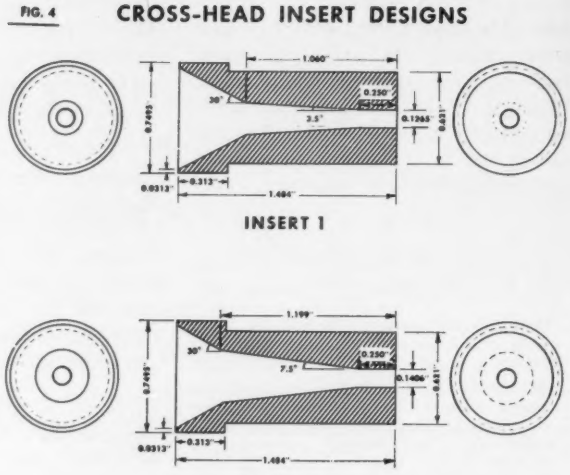


FIG. 3
STOCK TEMPERATURE vs ULTIMATE STRENGTH and ELONGATION
for AGED and UNAGED INSULATION
M.I. 2.0 POLYTHENE COMPOUND CONTAINING 2.5% CHANNEL BLACK AND 0.2% ANTIOXIDANT
INSERT NO. 5
WIRE SPEED 200 FT./MIN.
SAMPLES AGED FOR 7 DAYS AT 98 °C
ELONGATION, %
ULTIMATE STRENGTH, P.S.I.
STOCK TEMP., °F
1 - ULTIMATE STRENGTH BEFORE AGEING
2 - ULTIMATE STRENGTH AFTER AGEING
3 - ELONGATION BEFORE AGEING
4 - ELONGATION AFTER AGEING



No. 313 and the I.P.C.E.A. Standard S-19-81 Part 8 specifications are to be met, weather-proof wire insulation must have an ultimate tensile strength of 1400 p.s.i. The I.P.C.E.A. specification also states that the elongation of the insulation at break must be 350%.

★ ★ ★

At stock temperature levels below 430° F, insulation did not exhibit ultimate strengths and elongations at break sufficiently high to pass the requirements outlined in I.P.C.E.A. Standard S-19-81 Part 8 or C.S.A. Bulletin No 313 when a standard type insert was used.

★ ★ ★

Above a stock temperature of 430° F the tensile properties of the insulation had improved sufficiently to meet the specification requirements. Around this temperature, curves of stock temperature versus ultimate strength and elongation showed a sudden increase in slope which continued up to a stock temperature level of 500° F. There were no samples obtained above the 500° F stock temperature level. (See fig. 1.)

★ ★ ★

The appearance of the conductor jacket also improved as the stock temperature increased until a stock temperature of about 450° F was reached. Above this value, no appreciable improvement in finished appearance was observed. (See fig. 2.)

★ ★ ★

Field trials held at wire coating plants have shown that the effects observed during the laboratory evaluation are valid, regardless of differences in wire size. No. 14 solid conductor was used for the laboratory trials but on larger sizes of wire, which are much more common in the industry, it was observed that where the polythene was applied to the wire at a high temperature level, no difficulties were encountered in meeting the tensile requirements of weather-proof wire insulation specifications.

★ ★ ★

Low density polythene with melt indices varying from about 0.4 to 7.0 were evaluated and in all cases, increasing stock temperatures appreciably improved the tensile properties of the insulation. Of course absolute stock temperature values required were considerably higher for the low melt index compounds in order to obtain a satisfactory surface appearance.

★ ★ ★

Tensile tests were carried out to determine the aging characteristics of the polythene weather-proof wire insulation. The accelerated

(*Please turn to page* 214)

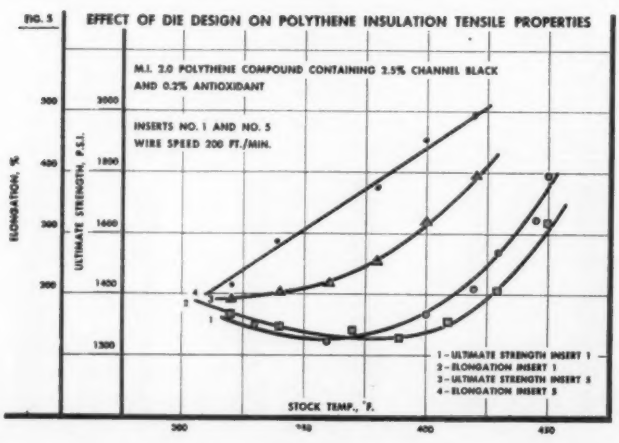


FIG. 5
EFFECT OF DIE DESIGN ON POLYTHENE INSULATION TENSILE PROPERTIES
M.I. 2.0 POLYTHENE COMPOUND CONTAINING 2.5% CHANNEL BLACK AND 0.2% ANTIOXIDANT
INSERTS NO. 1 AND NO. 5
WIRE SPEED 200 FT./MIN.
ELONGATION, %
ULTIMATE STRENGTH, P.S.I.
STOCK TEMP., °F.
1 - ULTIMATE STRENGTH INSERT 1
2 - ELONGATION INSERT 1
3 - ULTIMATE STRENGTH INSERT 5
4 - ELONGATION INSERT 5

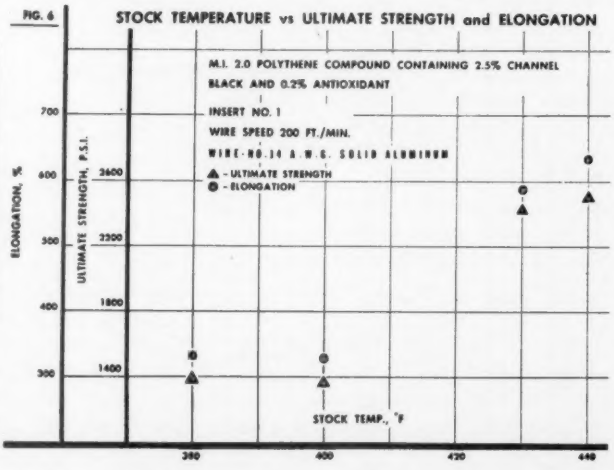


FIG. 6
STOCK TEMPERATURE vs ULTIMATE STRENGTH and ELONGATION
M.I. 2.0 POLYTHENE COMPOUND CONTAINING 2.5% CHANNEL BLACK AND 0.2% ANTIOXIDANT
INSERT NO. 1
WIRE SPEED 200 FT./MIN.
WIRE-NO.14 A.W.G. SOLID ALUMINUM
▲ - ULTIMATE STRENGTH
● - ELONGATION
ELONGATION, %
ULTIMATE STRENGTH, P.S.I.
STOCK TEMP., °F

NEWS OF INTEREST TO THE WIRE AND CABLE INDUSTRY VOL. III NO. 1

WIRE = Recorder

T.M. REG. U.S. PAT. OFF. MONSANTO CHEMICAL CO.

PUBLISHED BY MONSANTO CHEMICAL CO., PLASTICS DIVISION, SPRINGFIELD, MASS.

Monsanto

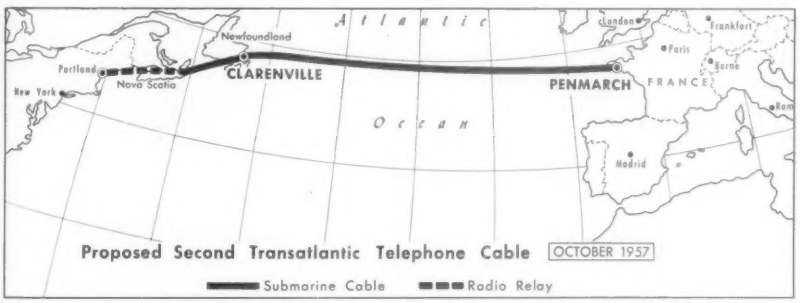
New Cable to Span Atlantic

Thirty-six new telephone lines, joining the United States with France, Germany and other European nations, will be available in early 1959 as the result of a recent agreement signed by German and French communication agencies and the American Telephone and Telegraph Company.

The new cable is planned to alleviate the growing demands on the first transatlantic cable system opened for service in 1956. The new addition will permit thirteen two-way circuits to France and a similar number to Germany. The ten remaining circuits will be divided between other European nations. The new cable will be similar to the one laid in 1956 and will be equipped with built-in amplifiers located approximately every forty miles.

Other cables of this type are currently in use between the United States and Alaska. The most recent unit was opened recently between California and Hawaii. Work on the new $40,000,000 cable between Europe and the United States is already under way.

The cable, which will stretch some 2,400 miles beneath the Atlantic, will join Clarenville, Newfoundland, with Penmarch, France. The cost of the operation will be divided between the United States and European agencies, with American Telephone & Telegraph sharing 64% of the expense, the remainder to be absorbed by the French and German agencies.



Fair or foul weather, H.M.T.S. Monarch, paid out each segment of cable across the Atlantic in one continuous run. Large buoy, hanging over port side of vessel, was used to mark end of segment.

Production of Polyvinyl Chlorides Increases

The vigorous growth in the market for polyvinyl chloride compounds, particularly felt in the demand for vinyl-insulated wire and cable, has prompted Monsanto Chemical Company to install additional equipment at its Springfield, Mass. plant. The enlarged facilities will permit a 75% increase in production.

Martin G. Caine, sales manager for vinyl resins and compounds, stated that the added facilities were installed to accommodate the greatly increased demands for Monsanto's vinyl compounds used in molding and extrusion. The Monsanto vinyls used by extruders and molders throughout the country have met with enthusiastic reception, resulting in unprecedented demand for the company's compounds.

The expansion of production facilities places the Springfield, Mass., plant in a position to meet growing demands for existing products and also permits them to add still more vinyl compounds to their present line.

Monsanto vinyl resins and compounds are produced under the Opalon trade mark. The company completed an expansion program last year which more than doubled their capacity to produce vinyl compounds.

Super-Radar System to Track ICBM's and Satellites

A joint research program by leading scientists of Columbia University and the U. S. Air Force achieved completion of a new radar system to track earth satellites and intercontinental missiles a few months prior to the launching of the first Sputnik by the Soviet Union.

(Continued on Page 3)

MONSANTO WIRE RECORDER

newsletter

ELECTRONIC LIGHTING...NEW MARKET FOR COATED WIRES...Panels for home and business, brilliant lamps for airports and super-stage lighting equipment lead the way toward molding million-dollar industry. Electroluminescence promises a high priority outlet for transistor and electron-tube accelerator power supplies. At the present time numerous firms are engaged in plans to use the new lighting technique in such products as flat-color TV tubes, electronic flash equipment and infrared spectroscopy.

* * *

ATOMIC POWER PLANT BEGINS OPERATIONS AT SHIPPINGPORT, PENNSYLVANIA...The first full-scale atomic power plant in the U. S. is now in operation at the Shippingport, Pennsylvania branch of the Duquesne Light Company. A 58-ton nuclear core containing 14 tons of natural uranium and approximately 165 pounds of highly enriched uranium "seed" is now supplying power to the Pittsburgh area. Initial capacity is 60,000 kilowatts with eventual potential rated at 100,000. Subsidized by the federal government, the $120 million project will be operated for the government by Duquesne Light.

* * *

WORK BEGUN ON $6.5 MILLION ELECTRONIC ACCELERATOR...Machine for experimental work on subnuclear particles slated for completion at Massachusetts Institute of Technology within two years. Accelerator will have 6-billion electron volt capacity when put in operation in late 1959 and will be the most powerful machine in the U. S. New knowledge of properties of subnuclear particles and forces is expected to be revealed through operation of the completed accelerator.

* * *

POST OFFICE ANNOUNCES PLANS FOR NEW ELECTRONIC DEVICES...Machine for sorting, conveyers for transport and many other electronic gadgets herald new era in mechanized mailing by 1964. With much equipment already in use, it is expected that the nation's leading post offices will be servicing mail almost entirely by machine within a few years. Automatic processing is expected to speed service by 50%, with eventual 24-hour mail delivery between any two points in the nation.

* * *

NUCLEONICS ATTRACT LARGE AUDIENCE AT '57 ATOMFAIR...Recent trade fair of Atomic Industry at New York Coliseum attracted widespread interest and large audiences. The show served as a trade fair for the Atomic Industry with more than 130 organizations displaying products in the field. Models of mechanical arms, equipment for handling radioactive or poisonous materials, uses of lead in shielding, and methods for disposal of atomic waste were a few of the subjects on display at last year's fair.

* * *

ELECTRONIC MACHINES SUPPORT TV AND RADIO AD SELLERS...Madison Avenue's leading ad agencies improve efficiency with installation of automatic data processing equipment. The new electronic systems serve as a clearing house in collating data for a variety of firms. Speed and accuracy are prime factors in rapid acceptance by agencies.

"Conquest" Conquers Public with Scientific Spectaculars

Monsanto's recently inaugurated television series dealing with new achievements in the world of science, presented with some of the world's leading scientists, has won the acclaim of TV critics and millions of viewers from coast to coast.

CBS news journalist, Eric Sevareid, acts as narrator on the spectaculars which demonstrate how chemistry changes everyday life into richer, more rewarding experiences. The first program of the series, dealing with creative chemistry in the "Conquest of Heat," was televised over 105 stations on December 1.

Features of the opening program included exclusive films of "Operation Man High," in which a scientist journeyed 100,000 feet above earth. New explorations beneath the ocean depths were also presented along with other new developments from the world of science.

The second offering in the series told of Dr. H. Julian Allen, the man who solved the crucial "re-entry problem" for missile recovery. Another guest on the program was Dr. Gerard Kuiper, a leading American astronomer, who revealed some surprising new theories on the evolution of the solar system. The International Geophysical year was also discussed and films were presented illustrating the work being accomplished.

Future programs will deal with the Conquest of the In Earth, Disease, The Insect World, and Distance. Participating with Monsanto in the production of "Conquest" are the American Association for the Advancement of Science and the National Academy of Sciences.

"Conquest" host Eric Sevareid (right) and Dr. E. Wiewara examine magnetograph traces held by Ft. Belvoir technician which record magnetic disturbances in the earth's atmosphere.

(Continued from Page 1)

The men engaged in the project developed a tracking method that successfully avoids the basic limitations of radar receivers; their acute sensitivity limit to noise. The means by which this was accomplished has remained secret. It was revealed, however, that the new technique involves a specially designed modulator which places an identifying characteristic or key on the carrier. The echo received is operated on special circuits contained in the receiver, permitting recognition of the receiver even though its signal strength is somewhat less than that considered usable by currently existing systems.

To a large extent, information on operating characteristics is considered classified. However, it is known that the transmitter uses special modulation. It does not use a magnetron, but can make use of a klystron or platinotron with a wideband operation. The receiver is equipped with a wideband front end, and new circuits use a combination of transient filtering coherent integration and spectrum analysis to detect signals.

The system results in a hypersensitive operation with the line of sight distance for a target about 600 miles high estimated at approximately 2,500 miles distance. Using such a range makes it possible to detect an earth satellite traveling in an orbit 300 to 700 miles above the earth. ICBM's can also be tracked when re-entering the earth's atmosphere up to 2,500 miles away, giving a few minutes advance warning — minutes of immense value.

Industrial TV Heads Toward Broad Market

Checking traffic in a tunnel on the West Virginia Turnpike, inspecting the interior of oil wells, providing a security check at plant or store entrances and checking gauges; these are only a few of the multiple uses for closed-circuit television on the industrial level.

Virtually ignored by TV manufacturers during the boom days of commercial set sales, the market for industrial television holds a multimillion dollar potential for manufacturers. Though sluggish in becoming established, it is expected that sale will take a rapid upturn, as industrialists learn of the many uses and extensive savings resulting from plant installation.

The success of installations has been proved on numerous occasions in a wide range of uses. One aircraft manufacturer has utilized the equipment for jet-engine testing, while another concern observes work with radioactive materials without exposing individuals to risk. The cameras have also come into wide use for traffic checking and for transmitting data in banks, offices and factories.

At the present time there are more than 20 manufacturers engaged in producing equipment for use in industrial TV. This is five times the total listed in 1953. During the past year some 1,350 camera tubes were produced for the exclusive use of closed-circuit operations. Most installations using such tubes are in the $1,000 to $5,000 price range. Estimates of the annual market in the coming years have been placed as high as $100 million by 1962.

MONSANTO WIRE RECORDER

Medical Uses of Electronics Take Rapid Upturn

Electronics as a means of diagnosing illnesses and furnishing treatment for diseases has been making important and rapid strides forward in recent years, with the present market attracting some $150 million annually for medical uses alone. Of this figure, approximately one-half is spent on X-ray and other radiological equipment, with the remainder channeled toward therapeutic and diagnostic devices.

It has been predicted that within ten years electronics will supplement many current surgical practices and medical therapies. The development of the transistor is credited as accelerating the acceptance of electronics in medicine because of its ability to miniaturize equipment which can now be utilized by general practitioners, whereas the old-style equipment was too bulky and difficult to handle in crowded offices.

One of the many new electronic devices being introduced in the medical field is the elastometer, used in examining artery hardening and deterioration as functions of aging and pathological processes. In the development stage is an electrodiagnostic device similar in operation to the electrocardiograph and the electroencephalograph. Also in experimental stage is an improved ballistocardiograph for recording the output of blood from the heart.

Based on current uses and developments, the future of electronics in medicine indicates a widespread increase in acceptance of electronic devices by the medical profession. All of this points to corresponding increases in the use of insulated wire necessary to the development of such instruments.

Globe on World-Wide Building Binge —

U. S. Constructors and Boa Constrictors are meeting on common ground these days as the world enters a building boom which has engineers plotting construction in such unlikely areas as Aden, Jamshedpur and Surabaja.

The reason for this unusual activity in many of the so-called underdeveloped nations is their desire to utilize resources and to enlarge whatever industries as are already in existence. The field has proven to be an interesting one to American companies — although its problems are sometimes difficult and nearly always unique.

In one recent report received by Kaiser engineers, it was reported that surveying was running behind schedule due to the time required to "watch for cobras." Another report tells of the loss of a water closet, destroyed when a water buffalo crashed into it.

Overseas construction, while not an entirely new field for U. S. concerns, has now tripled in size from the activity before World War II. Some thirty nations are included in projects currently under way, with the majority of the outlay for the work being paid for by foreign governments and businesses. The U. S. government, however, continues to be a major overseas builder, accounting for roughly 10% of the overseas construction.

Much of the foreign building is industrial with steel mills, refineries, pipelines and other commercial projects heading the list. Although the problems are many, the rewards are sufficiently attractive to have accounted for close to one billion dollars in overseas construction last year alone. The major attraction in American firms as builders, in opposition to foreign concerns, is that they are able to command the necessary equipment for the jobs, and they are in a position to complete work in considerably less time than are most foreign contractors.

THREE OPALON® VINYL COMPOUNDS BECOME PERMANENT MEMBERS OF PRODUCT LINE

Three hard-working vinyl compounds, Opalon 72285, Opalon 72217 and Opalon 71329, have proved themselves in field application and are now removed from the evaluation stage to become permanent additions to the Monsanto product line.

Opalon 72285 has a new product designation of Opalon 1102. With a specific gravity of 1.29, Opalon 1102 provides weather-resistant insulation and jacketing for rural and urban telephone distribution wire.

Opalon 72217 becomes permanently known as Opalon 1217. With a specific gravity of 1.39, Opalon 1217 provides rugged jacketing for communication wire and cable, as well as for general-purpose jacketing applications.

Opalon 71329 is now called Opalon 1309. With a specific gravity of 1.37, versatile Opalon 1309 provides excellent primary insulation and jacketing for wire and cable applications where flexibility is an important factor. Opalon 1309 is especially suited for SPT-type jacketing.

We are pleased to announce these three efficient vinyl compounds will be permanently available. If you have questions concerning their use of, or information on Monsanto's broad line of vinyl compounds for the wire and cable industry — contact your Monsanto sales representative or write to Monsanto Chemical Company, Plastics Division, Springfield 2, Massachusetts.

Monsanto®

MONSANTO CHEMICAL COMPANY
PLASTICS DIVISION — SPRINGFIELD, MASSACHUSETTS

Fatigue of EC Aluminum Wire

by C. E. Burley
Research Supervisor
Physics and Electrical Conductor Section
Metallurgical Research Laboratories
Reynolds Metals Company
Richmond, Virginia

Synopsis

The fatigue properties of three lots of EC-H19 aluminum wire have been evaluated. Each lot of wire was drawn under identical conditions from a different commercial source of EC redraw rod. Wire fatigue tests were conducted at three independent testing laboratories. Stress-lifetime data show that no significant differences exist among the three lots of wire. Thus the fatigue properties of wire drawn from redraw rod made from slit sheet are comparable and equal to the fatigue properties of wire drawn from conventional redraw rod.

Introduction

The Reynolds Metals Company is unique in the aluminum industry in its method of producing EC redraw rod. The Reynolds process consists of hot rolling a billet to 0.2" thick sheet and then slitting the sheet into 1" wide strips. These strips are cold rolled into a

This is a condensation of a Metallurgical Research Report on the fatigue characteristics of aluminum EC wire drawn from redraw rod produced by the slit-sheet process developed by the author's company, in which it is shown that the fatigue strength is equal to that of the wire drawn from conventional hot rolled redraw rods.

3/8" diameter redraw rod and annealed to desired hardness. The conventional method used by other aluminum producers consists of hot rolling 6 to 12" square billets of EC alloy into 3/8" redraw rod. The wire drawing practices of all producers are essentially equivalent.

★ ★ ★

The Reynolds process was commercially introduced in 1949-50. Since that time 200-300 million pounds of EC wire have been drawn from slit sheet redraw rod at the Listerhill Cable Plant. Electrical cable made from this wire has been used in innumerable installations with successful results.

★ ★ ★

From a metallurgical point of view little reason existed for questioning the fatigue properties of wire drawn from slit-sheet redraw rod. However, no experimental data on fatigue were available, and a program was initiated in May, 1956, to evaluate the fatigue strength of EC wire. The primary purpose was to determine if there were significant differences in the fatigue properties of wire drawn from Reynolds' slit-sheet and competitors' conventional redraw rod.

Conclusions

The summary stress-lifetime (S/N) diagrams, Figures 1, 2, 3, 4, indicate the similarity of the fatigue properties of the three lots of wire. While some differences exist in the relative fatigue strengths at high and low stresses, the differences are so small that they are considered to be insignificant on a statistical basis.

★ ★ ★

The fatigue strength of EC aluminum wire drawn from slit-

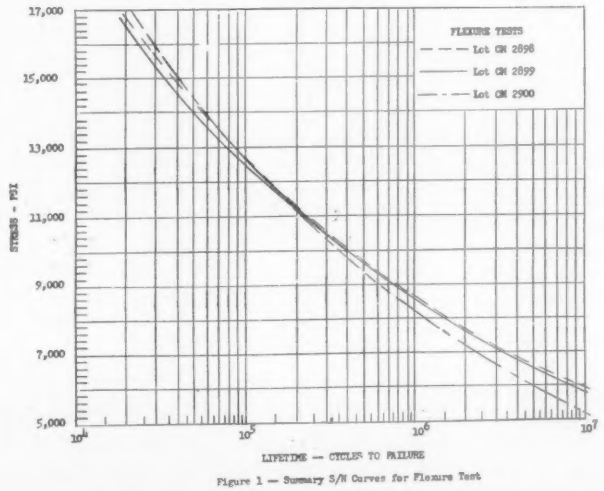


Figure 1 — Summary S/N Curves for Flexure Test

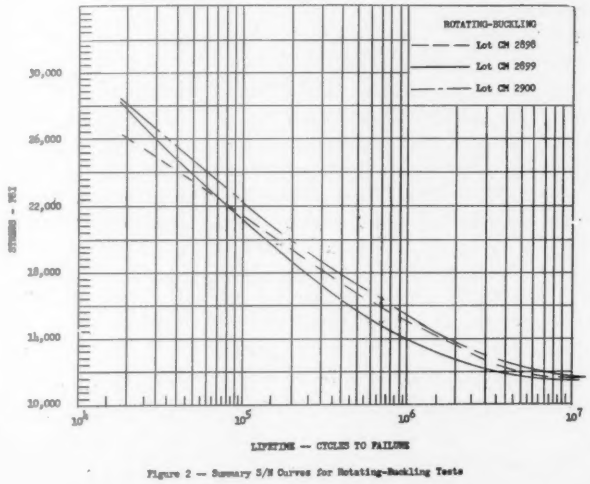


Figure 2 — Summary S/N Curves for Rotating-Buckling Tests

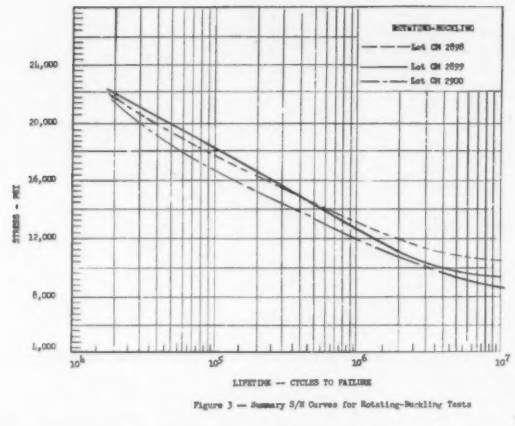


Figure 3 — Summary S/N Curves for Rotating-Buckling Tests

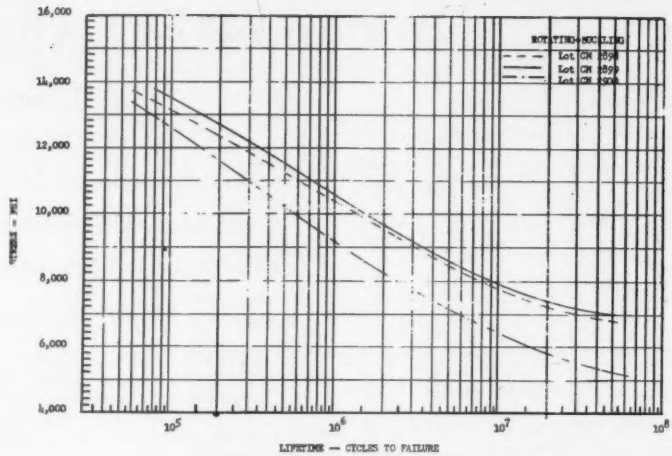


Figure 4 - Summary S/N Curves for Rotating-Buckling Tests

sheet redraw rod is equal to the fatigue strength of EC wire drawn from conventional redraw rod.

★ ★ ★

The numerical values of the stresses given on the S/N curves are inferred from measurements of strain and applied load. Duplication of results on different machines is difficult, but very comparable data have been recorded by the three testing groups. The data obtained at each testing laboratory have been consistent, and while somewhat different stress values have been calculated by each group, the same conclusions have been independently reached at each laboratory.

Experimental Program
Sample Preparation

To eliminate as many variables in the fatigue evaluation as possible, all wire samples were drawn under identical conditions at the Sheffield Cable Plant. Three two-hundred pound coils of redraw rod were obtained—two coils of conventional rod were purchased from competitors and a coil of Reynolds rod was randomly selected from mill stock. All redraw rod used was EC-H14. Several thousand feet of EC-H19 wire, .1327" diameter, were drawn, and 1000 feet of each wire lot were straightened and cut into 4-foot lengths for testing. The straightening and cutting of all wire specimens was carried out at the Cable Plant. The wire gauge chosen is a median value of those gauges used in electrical cable.

★ ★ ★

The wire specimens were visually examined to determine if surface defects existed. All of the specimens examined exhibited essentially the same surface condition. Physical Properties and electrical conductivity were obtained. Samples of each lot of wire were then assembled, coded and labeled, and shipped to the testing laboratories.

★ ★ ★

Thus, care was exercised to have all three wire lots drawn under identical conditions and samples prepared identically so that the test specimens would be equivalent except for variation in the metallurgical properties of the redraw rod.

Fatigue Testing

Fatigue tests on as-drawn wire have been carried out at the **Pacific Testing Laboratory, Inc.,** Van Nuys, California, and at two other independent laboratories.

★ ★ ★

At the Pacific Testing Laboratories two types of fatigue tests have been conducted. The first method, a flexure test, simulated the type of bending which would occur due to flexing at a clamp location. Specimens were clamped in a precision collet and flexed by a pin load at the free end. The Krouse Cantilever Beam Machine was used.

★ ★ ★

In this test maximum moment and stress are at the fixed end, and failure occurred at the edge of the collet. Tests were conducted at constant amplitude at 2000 cycles per minute. A special light weight fixture was made for the pin loaded end to minimize inertial overthrow. The maximum stress corresponding to various deflections was determined by hanging dead weights at the pin loaded end and measuring the deflection. Stress at the collet location was then calculated from the moment and the section modulus. There is, of course, a high stress concentration at the clamp which is not considered in the nominal stress calculations.

★ ★ ★

The second test, a rotating-buckling test, simulated the bending stress distribution which would occur at a point of inflection of the unsupported wire. Samples were tested using the rotating-buckling attachment of the Krouse Rotating Beam Machine. In this test one end of the specimen is held in an accurate collet and an end load applied at the other through a hinged pin so as to buckle the wire. The bending moment and stress is greatest midway between the two ends, and fatigue failure occurred at this location. The buckled specimens were rotated at constant amplitude at 11,000 rev. per min. The stress was calculated from the deflection angle of the wire and the elastic modulus of the material.

★ ★ ★

The test program at the other two laboratories consisted of simi-

(*Please turn to page* 212)

Government Wire Production Information

Administration Proposals on Renewal of the Trade Agreements Act

At the President's meeting on December 3, Congressional leaders were informed of his proposals with respect to renewal of the Trade Agreements Act, which are designed to provide the necessary new tariff bargaining authority for an adequate period with safeguards for the American economy. Secretary of Commerce, Sinclair Weeks and Deputy Under Secretary of State for Economic Affairs, C. Douglas Dillon, today announced details of the Administration proposals.

★ ★ ★

It is proposed that authority to enter into trade agreements would be extended for five years from the date of its expiration on June 30, 1958. New tariff reduction authority will be proposed as follows:

★ ★ ★

The President would be authorized to reduce any rate of duty existing on July 1, 1958:

(a) By 5 percent of the duty annually for five successive years. However, as an alternative, he could reduce a duty by this same total amount over a 3-year period if no yearly reduction exceeded 10 percent of the duty.

(b) By three percentage points ad valorem, without any yearly reduction exceeding 1 percentage point.

(c) To 50 percent ad valorem if an existing duty is in excess of that amount. In such cases not more than one-third of the total reduction could be made in any one year.

★ ★ ★

These would be alternative methods which could not be used cumulatively.

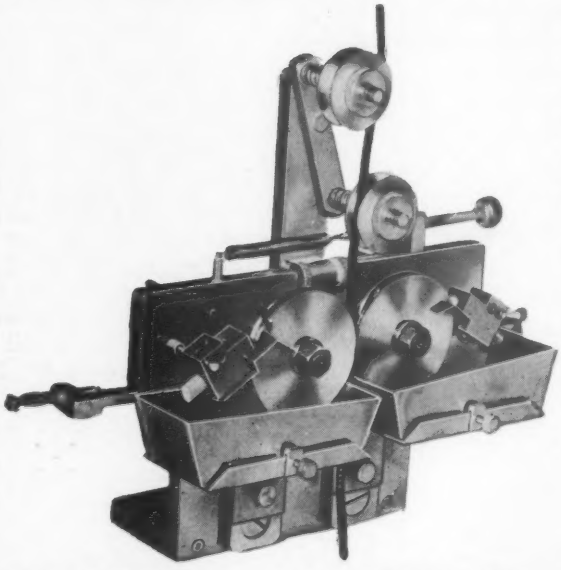
★ ★ ★

All safeguards for American industry contained in the present act would be continued. In addition, increased authority will be sought to raise duties to remedy threatened or actual serious injury to domestic industries when found necessary after escape clause investigations. The President would be authorized to raise the duty in such cases to 50 percent above the rate of duty in effect on July 1, 1934 (instead of 50 percent above the lower duties of July 1, 1945, as in existing law).

★ ★ ★

The President's proposals would also authorize the immediate institution of escape clause proceedings after peril point investigations disclose that existing rates of duty threaten or cause serious injury, rather than delaying such investigations until after the President has sought to negotiate increases in duty with foreign countries, in accordance with existing law. These changes will en-

MARKING WHEELS and MACHINES for ELECTRIC WIRE



Gillies Engraved Concave and flat marking wheels are widely used printing the I.P.C.E.A. color code, numerical, semi-spiral striped, dating, or manufacturer's identification, etc. on insulated wire, tubing or hose.

Machines print on ONE or BOTH SIDES in large legible letters. Wheels are adaptable to any machine—or we will supply the machines.

Wheels, shafts, ink pans and all accessories are readily removable for quick and easy cleaning.

Wheels are made of TOOL STEEL, HARDENED to Rockwell test 61-64 and HARD CHROME PLATED.

Send for samples of wire and prices on wheels and equipment.

"There is no substitute for QUALITY when combined with SERVICE!"

DUNCAN M. GILLIES CO., INC.

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WEST BOYLSTON, MASS.

Telephone: West Boylston TE 5-4445

REELS FOR WIRE?

WIRE APCO MOSSBERG!

When you need steel reels, spools or bobbins fast, a wire to Apco Mossberg can save you hours of time and trouble.

Modern, high speed production facilities and a thorough knowledge of wire and wire rope handling methods enable Apco Mossberg Engineers to handle your packaging problems pronto! Their ability to produce custom designed units quickly and economically is one reason why more and more major wire manufacturers "ask for Apco" first. Why not put their experience to work for you?

Wire, phone or write us today for preliminary recommendations at no obligation.

Pacific Coast Representative:
Gordon Proffitt
World Trade Center
Ferry Building
San Francisco 11, California

Canadian Representative:
Hugh P. Williams & Co.
47 Colburne Street, West
Toronto, Ontario, Canada

APCO MOSSBERG COMPANY
LAMB STREET, ATTLEBORO, MASSACHUSETTS

able more prompt and effective action in serious injury cases.

★ ★ ★

Expanded international trade, which strengthens the American economy, which links together the interdependent economies of the free world and which is essential to future economic progress, will be of key importance. Countries of the free world must make new efforts to reinforce their unity and economic strength in the face of the intensified challenge presented by International Communism.

★ ★ ★

The trade-agreements program is the means through which the United States is able to participate in cooperative measures to expand international trade by means of the reduction of tariffs and trade barriers on a mutually advantageous basis. An effective Trade Agreements Act, adequate in both duration and tariff bargaining authority, is the prerequisite for such an effective trade-agreements program. Without adequate legislative authority American influence and leadership in expanding world trade would cease.

★ ★ ★

The next five years will be of critical significance. In Western Europe the six governments of Belgium, France, Germany, Italy, Luxembourg and the Netherlands have taken a tremendous step toward freeing international trade among themselves with the establishment of the European Economic Community. The Community will come into being on January 1, 1958. Thereafter, over a period of several years, trade among the six countries will become progressively freer, and a single tariff will be established with respect to imports from other countries.

★ ★ ★

It will be of great importance to the economic well being of the United States and to other free world countries that the new common tariff of the European Economic Community be reduced as low as possible in order that all may benefit more fully from trade with this new market of 160,000,-

000 customers. To this end it will be necessary to conduct comprehensive tariff negotiations between the Common Market countries and other free world countries prepared to participate. Such negotiations will require extensive preparations and will take some 5 years to complete.

★ ★ ★

The Common Market countries, in the Treaty Establishing the European Economic Community, have declared their willingness to enter into negotiations on a reciprocal basis with non-member countries. It remains for other countries and especially the United States, to respond to this initiative. If it is to do so, an effective 5-year extension of the trade-agreements legislation is essential.

Diamond Dies to be Stockpiled

The General Services Administration announced at the turn of the year that it will purchase unmounted industrial diamond dies for the national stockpile. The agency is calling for offers of dies ranging in size from .0004 to .0008.

★ ★ ★

Invitations to participate in the program already have been sent to members of the diamond die industry by GSA's Defense Materials Service, which administers the stockpile. Any suppliers not reached through this mailing may procure invitations to bid by calling or writing the Industry Branch, Defense Materials Service, GSA Regional Office Building, Washington 25, D. C., by January 3, 1958. Offers must be returned within 25 days from the date the invitations are issued.

★ ★ ★

According to the GSA announcement, diamond die offers should be based on estimates of monthly deliveries covering a twelve-month period, exclusive of lead time. The agency also is asking bidders to indicate the time required between the contract award date and the beginning of deliveries and whether the dies offered are to be procured from domestic or foreign sources.

For Fungus Resistance, Specify

TEXTILENE TWI-TAR

Offering great durability along with light weight, Textilene Twi-Tar is successfully used for buried communication cable (bedding and overall serving), expanded ACSR cable (expander between core and conductors), stationary power cable and portable cables.

Twitchell's superior Textilene line also includes: Moisture-resistant fillers — *Twi-Flex* and *Twi-Wax*. Used for non-metallic sheathed cable, maritime shipboard cable, varnished cambric cable.

Soft, dry fillers — *Twi-Port* and *Glascor** (Fiberglas-centered for high tensile strength without added bulk). Used for control, power, appliance, coaxial and communications cables, and all types of portable and flexible cords.

*Patent Applied For

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

E.W. TWITCHELL INC.

Third and Somerset Streets, Philadelphia 33, Pa. • REgent 9-7800

PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

a
bright new
wire
with a
brighter
tighter
finish

Brytite®

A PATENTED GALVANIZING PROCESS

SO BRIGHT—Use *Brytite* wherever a shinier, brighter zinc coating is desired for long lasting, more sparkling product appearance. Eliminate polishing and special finishing operations

SO TIGHT—Brytite has remarkable forming qualities. The zinc coating is so tight it will withstand severe deformation of the base metal without flaking, powdering or peeling.

SO CLEAN AND SMOOTH—Satin smooth in looks and feel, BRYTITE immediately raises the quality appeal of your product. You get smoother production, too—the result of precise uniformity and quality controls.

ROUND AND SPECIAL SHAPES—*Brytite* is available in many sizes in round wire, and may on inquiry, be furnished in standard and special shapes—flat, half-round, oval, half-oval, square, rectangular, and many others.

TEMPERS AND ANALYSES—Specify BRYTITE in various tempers and analyses in the low carbon and medium low carbon steels.

FINISHES—Satin Finish, Unwiped (where a heavy weight of zinc coating is required) and Redrawn, in certain sizes.

no polishing...no buffing...no finishing...

withstands difficult forming operations

CONTINENTAL STEEL

CORPORATION · KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, BRYTITE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence and other products.

Diamonds by the Pound

Industrial diamonds — made by man and equal in performance to those made by nature—are about to be produced in substantial quantities, it was revealed on October 22nd last by the **Metallurgical Products Department** of **General Electric Company.**

★ ★ ★

Kenneth R. Beardslee, general manager of the Department, said more than 100,000 carats of the man-made diamonds already have been produced in pilot-plant operations in Detroit. The nation's dependence upon the diamond supply in the Belgian Congo and

Thousands of carats of man-made industrial diamonds like those in the dish have been produced by the Metallurgical Products Department of General Electric Company. The diamonds shown here are valued at about $30.000.00

South Africa has been partially lessened and hopes persist that complete independence can be gained within a few years.

★ ★ ★

60,000 carats of the laboratory-made diamonds were displayed at a special press conference in which company officials described science's victory over another technological challenge. Diamonds, because they are indispensable in many industrial operations, have been classified as a critical material by the United States Government.

★ ★ ★

Much of the machining on aircraft, guns, shells, tanks, trucks and automobiles is done with cemented carbide tools and diamond grinding wheels are used in the production and sharpening of these carbide tools. Without diamonds, Mr. Beardslee said, much vital production would be seriously affected.

★ ★ ★

United States industry will have

imported an estimated seven million carats of fragmented bort for industrial use in 1957. This is the class of natural material with which General Electric man-made diamonds will be competing. Bort is made by crushing material that is imperfect for use as single stones. By the end of 1957, a substantial quantity of man-made diamonds will be in industrial use.

★ ★ ★

John D. Kennedy, manager of the Diamond Section, said the current price of man-made ungraded diamonds is slightly above the cost of ungraded natural diamonds. He pointed out, however, that improved techniques should bring that price down gradually.

High Density Polyethylene Plant Opened

W. R. Grace & Co.'s Polymer Chemicals Division announced on December 2, 1957, that their high density polyethylene plant in Baton Rouge, La., had completed its first two weeks of successful operation. Delivery of the product will commence shortly.

★ ★ ★

First announcement concerning Grace's initial production of the new plastic resin known as Grex was made by **J. Peter Grace,** president of the parent organization at the November Board of Directors meeting in New York.

★ ★ ★

The new plant with an annual capacity of 50,000,000 pounds is the largest plant of its kind in the world to come on stream as an integrated operating unit. It is also the first polyethylene plant to be built in Louisiana. The overall investment in commercial plant, research and development facilities exceeds $18,000,000.

Pollution Control Unit For Wire-Coating Ovens

A packaged air pollution control system for oxidizing solvent fumes, varnish vapors and other objectionable effluents in the exhaust gases of wire coating ovens

'FLIP TOP' four-Slide

NEW VERTICAL SWING BED SAVES TIME SPEEDS WORK

BAIRD

number OO

automatic four-slide

NEW TOOLING ACCESSIBILITY.....Back—front; top—bottom
NEW INCREASED FEED LENGTH.....Positive, accurate, up to 4¼"
NEW COMPACT DESIGN.....Less than 2½' x 2½' floor space

While basic design and equipment of this machine have been PROVED in millions of production hours, these important NEW features save time in tooling and maintenance, reduce down-time and increase capacity.

Ample tooling spaces at all positions and extra long feed present new opportunities for economical production of parts now being made by more costly methods. Baird's pioneering experience in this field can help you. Send us parts or prints for production analysis. Write Dept. WP.

THE BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

BAIRD

Six and Eight-Spindle Chuckers • Automatic Multiple Transfer Presses • Automatic 12-Station Duplex Turning Machines • Vertical Continuous Lathes • Automatic Four Slide Machines • Pressformatic Ribbon Metal Forming Machines • Barrel Finishing Machinery • Machinery for Chain and Roller Chain Production, Garment Hook and Eye Production • Precision Bench Presses

3BA58

Typical samples of the wide variety of wire available from Prentiss.

for the exact wire you want ...when you want it PICK PRENTISS

PICK PRENTISS for all your wire needs. We'll supply you with wire of just the temper, the finish, the grade you require—either from stock or to order. Choose from ferrous or non-ferrous types, packed in coils for use on detachable-head spools or new Prentiss-Pak coils. And, very important, your wire will be delivered *on time,* as promised, and to your specifications.

PICK PRENTISS too, for our one-hundred-year reputation for *fine wire;* for consistent quality and uniformity. Special drawing and finishing techniques—*exclusive* with Prentiss—are examples of the superior skills and knowledge that go into every Prentiss product.

FOR FREE CATALOG of Prentiss Wire Products, and for the name of your nearest Prentiss representative, wire, write, or call collect, PRENTISS WIRE MILLS, RIVERSIDE-ALLOY METAL DIVISION, H. K. PORTER COMPANY, INC., Holyoke, Mass.

H. K. PORTER COMPANY, INC.

RIVERSIDE-ALLOY METAL DIVISION

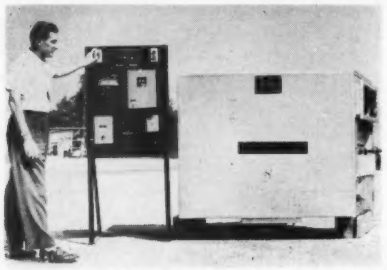
has been developed by **Oxy-Catalyst, Inc.**

★ ★ ★

Similar in principle to custom-engineered systems previously installed by Oxy-Catalyst in wire and other metal coating industries, the compact packaged unit eliminates at source the potential causes of community and employee relations problems.

★ ★ ★

Designated as Type EW-51 Catalytic Oxidation Unit, it can be used efficiently on almost all elec-



Type EW-51 Oxycat Unit

trically-heated vertical wire coating ovens and, with minor adaptations, on most gas-fired vertical ovens. The unit is shipped ready to install on top of the oven by the customer.

★ ★ ★

Complete information on the EW-51 packaged unit and other Oxycat stack purifiers is available on request to Oxy-Catalyst, Inc., Wayne, Pa.

Corporate Name Shortened By Young Spring & Wire

L. A. Young Spring & Wire Corp. will change its corporate name to **Young Spring & Wire Corp.** effective December 2, 1957.

★ ★ ★

The founder, **L. A. Young,** is no longer associated with the company.

★ ★ ★

Since 1906, the Young organization has been a leading supplier of seat and back cushion springs, tubular seat frames, garnish mold-

ings and diversified wire products to the automotive industry. It also serves the furniture and bedding industries.

★ ★ ★

In a diversification program begun in 1954, the company has become established as a manufacturer of outdoor materials handling and roadbuilding equipment, structural parts for aircraft and missiles and electronic communications equipment, with a total of 19 plants.

Continuous Tumblasts Feature End Discharge

The 26″ Continuous Tumblast with end discharge is the latest addition to the line of continuous tumbling-type blast cleaning machines manufactured by the **Wheelabrator Corp.,** 1184 S. Byrkit St., Mishawaka, Ind.

★ ★ ★

The Continuous Tumblast is designed to handle a continuous flow of miscellaneous work at a high rate of production. The blast cleaning is completely automatic and continuous. Work enters the machine from one end directly into the cleaning chamber; it then passes down an inclined chute into the discharge drum and is dropped from there into a tote box or conveyor.

★ ★ ★

The unique combination of tumbling and longitudinal travel uniformly exposes all surfaces of every part to the abrasive blast of the overhead wheelabrator unit or units. As a result even the most intricate pieces are thoroughly cleaned at a production speed geared to any need.

★ ★ ★

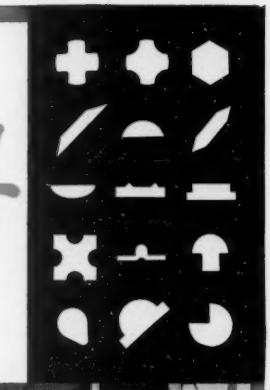
Other sizes in the Continuous Tumblast line are 15″, 36″, 48″ and 60″. The 26″ machine is described in the new bulletin No. 141-D which can be obtained free by writing to the manufacturer.

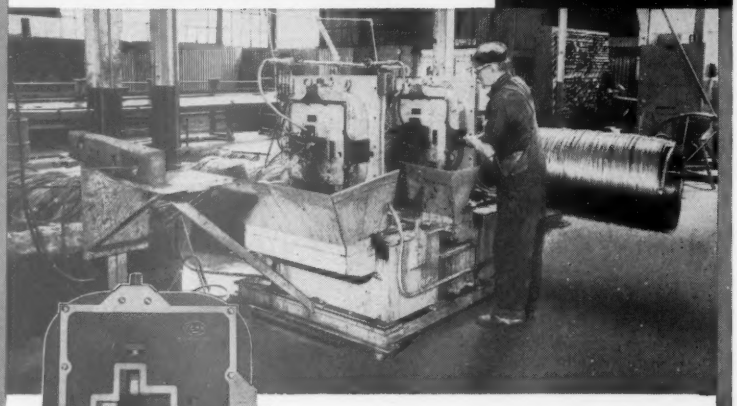
Pre-Fabricated Wire Rope Assemblies Announced

To save time and reduce costs, it is no longer necessary to make

Wire Shaping

BETTER, FASTER at LOWER COST





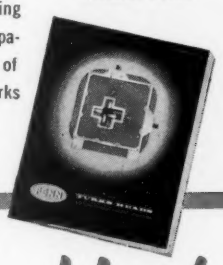
15,000 Pounds of Shaped Wire Per 8-Hour Production Run

The Fenn 4U Universal Type Tandem Turks Head is shown in use at The National Lock Washer Company in Newark, New Jersey. Prior to being formed into lock washers and retaining rings, the wire is drawn through the tandem Turks Head for a two-step reduction which in this case results in a keystone-shaped cross section. The Shaped Wire Division of National Lock Washer, 100% equipped with Fenn Turks Heads, turns out 10,000 to 15,000 pounds of shaped wire every 8-hour production run with only three operators required to maintain this high production rate. Fenn Turks Heads may be used singly, in tandem as illustrated, or in tandem with a rolling mill or draw bench. For complete information on the capabilities, advantages and capacities of the four basic types of Fenn Turks Heads, send today for the new illustrated Turks Head Catalog No. TH56.

FROM ROUND

TO KEYSTONE

IN A SINGLE PASS



FENN Turks Heads

THE FENN MANUFACTURING COMPANY • 601 Fenn Road • Newington, Conn.

EFFICIENT, MODERN SYSTEMS

FOR

ELECTRICAL WIRE & CABLE MANUFACTURING

• *CABLE LACQUERING SYSTEMS*

Conventional cellulosic, or other type, lacquers are applied in successive continuous coats from one to twenty-eight coats over fibrous braid wrapped primary conductors. One end, four ends, or eight ends of wire are handled continuously. System includes letoff, application, drying and constant tension takeup equipment.

• *WIRE ENAMELING SYSTEMS*

Natural and synthetic enamels, silicones, solution nylon, modified plastisol, and similar insulating coatings are applied to bare, cotton or glass covered wire in round, square or rectangular cross section. Ten or twenty simultaneous strands are handled. Systems are complete with letoff, preannealer, application system, capstan and multiple takeup unit.

• *ASBESTOS INSULATING SYSTEMS*

Carded asbestos is applied to continuous single conductor as an integrated operation with saturating, rotary forming, drying, cooling and polishing of the finished wire. Wire from No. 20 gauge to No. 6 AWG is handled through an asbestos wall thickness range of from .008″ to .040″ thickness in a single pass.

• *RUBBER OR PLASTIC JACKETING SYSTEMS*

Rubber and thermoplastic jacketing compounds are continuously applied to electrical wire or cable by the extrusion method. High speed, constant tension letoff and takeup equipment, controlled cooling or continuous vulcanizing equipment are powered by synchronized range drives as complete, integrated wire handling systems. Extrusion machines of customer's choice are furnished.

• *GLASS & VARNISH COATING SYSTEMS*

Double layer of glass or cotton wrapping is applied to round, flat or square conductor. Two individual coatings of high temperature varnish are applied and the finish baked in a continuous operation. Units are complete from letoffs to takeup frames.

• *SELF TRAVERSING REEL CORD DRYERS*

These ingenious machines are used to remove hygroscopic moisture from fibers, braided or knitted flexible cable. These machines increase extrusion speeds, reduce blister scrap loss and improve diameter control. They are easily installed in existing extrusion line.

TECHNICAL INFORMATION ON ANY OF THESE PROCESSES UPON REQUEST

C. A. LITZLER CO., INC.

1817 BROOKPARK ROAD

CLEVELAND 9, OHIO

up cable assemblies by hand with splicing, clipping, etc.

★ ★ ★

Now precision lengths of wire rope with fittings permanently attached by swaging are pre-fabricated to order by specialists. Assemblies are made ready for installation on equipment and can be carried in stock thus assuring the correct fittings attached and the correct length of wire rope for the machine intended.

★ ★ ★

Announcement showing examples of prominent manufacturers equipment using pre-fabricated "Safe-Lock" Assemblies is contained in publication Ropeology No. 50. Copy is available on request to **Macwhyte Company,** Fabricated Products Sales, Kenosha, Wis.

Crucible Steel Acquires Rem-Cru

Crucible Steel Company of America has announced that, subject to Securities and Exchange Commission approval, it has acquired 100 per cent ownership of **Rem-Cru Titanium, Inc.** by an exchange of 150,000 shares of Crucible common stock for the entire half interest owned by **Remington Arms Co.** This will give Crucible facilities for production of titanium and vacuum arc-melted steel products. Crucible pioneered in the production of vacuum induction melted steels and other metals, and the present acquisition gives it unusually complete and extensive equipment for melting and processing metals.

★ ★ ★

Rem-Cru Titanium, Inc. was organized in 1950 as a joint venture of Remington Arms and Crucible. In plant facilities adjacent to Crucible's works at Midland, Pa., it has produced titanium ingots, slabs and billets from purchased titanium sponge for conversion into sheet, bars, wire and other mill products, chiefly in the Crucible plants. Rem-Cru's plant consists of 237,000 square feet of factory buildings and engineering, office and research buildings on 11 acres of land in Midland and 262 acres near Midland.

Outstanding Personalities of the Wire Industry

Archie Lauder Retires

Archie Lauder retired on January 1st from active duties as Vice President (Consulting) of **Phillips Electrical Co. Ltd.**, Canada. He has been an active member of The Wire Association for the past 24 years and has an association with the industry covering more than half a century.

★ ★ ★

His early training was received at **British Insulated Helsby Cable Company** (now BICC) which he joined in 1905. Then, in 1913 Mr. Lauder left to come to Canada as superintendent of the Power and Telephone Cable Departments of the Phillips company, where he rose rapidly in the factory operation.

★ ★ ★

By 1934 he was Works Manager of both the Montreal and Brockville factories and in 1954 was appointed Vice President (Engineering & Production), becoming Vice President (Consultant) in 1957.

★ ★ ★

Among his many other distinctions, Mr. Lauder is a member of the Telephone Pioneers of America, and a Governor of the Children's Memorial Hospital, Montreal.

Archie Lauder

★ ★ ★

His many friends and associates will be glad to know that he will still be carrying on his activities after retirement, in a consultative association with the Phillips company in Brockville.

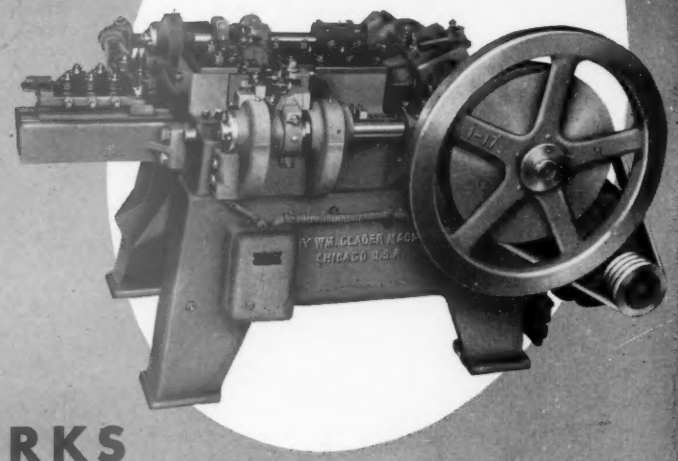
Norton Adds to Sales Staff

Norton Company, Worcester 6, Mass., has created two new positions in the sales management of its Abrasive Division, to become effective January 2, 1958. **Robert Cushman,** will become Manager of Marketing Services and **W. Alexander McCune, Jr.** will become Manager of Field Sales.

★ ★ ★

In his new position, Mr. Cushman will be responsible for the Sales Engineering Department, Sales Service Department and Distributor Sales Promotion Department. Mr. McCune will have complete responsibility for the super-

high efficiency — low cost
with GLADER wire nail machines



Eliminate costly down-time in the Nail Mill by replacing obsolete machines with new GLADER NAIL MACHINES . . . For tops in efficiency and economical operation use GLADERS.

WM. GLADER
MACHINE WORKS

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Export Dept., 122 East 42nd Street, New York 17, N. Y.

vision of the field sales force and for carrying out the policies, procedures and programs agreed upon by sales management.

Appoints Technical Representative

Walter B. Morehouse, vice president in charge of sales for the **Nopco Chemical Company's** Industrial Division, has announced the appointment of **William F. Dolan, Jr.** as technical sales representative in North Carolina and the eastern part of Tennessee.

★ ★ ★

Mr. Dolan, a graduate of Alabama Polytechnic Institute, has been with Nopco's Textile Chemicals Division since 1955. He will handle Nopco's processing chemicals including such products as esters, ethylene oxide condensates, amides, metallic soaps, sulfonates, water soluble polymers and resin and wax emulsions.

Dr. Otto C. Schmid

Dr. Otto C. Schmid, co-owner and director of **Wafios Maschinenfabrik,** Reutlingen, Germany, died on January 19th as a result of injuries sustained in an automobile accident.

★ ★ ★

Dr. Schmid was born on January 22nd, 1898, and would have celebrated in January his 60th birthday and 35th year with Wafios.

★ ★ ★

After receiving his doctorate in Engineering at the Stuttgart Technological Institute, he came to the United States where he remained for several years. During this time he worked for several of the large wire machinery builders and wire mills. With this practical experience behind him, Dr. Schmid returned to Germany and in 1922 joined forces with the partners Wagner and Ficker who were engaged in the manufacture of wire forming machinery in Reutlingen.

★ ★ ★

The Wafios factory was completely destroyed during World War II and Dr. Schmid had to rebuild his organization from the ground up after the war. Since that time, he has guided Wafios to the position of being one of the largest organizations of its kind in the world, employing over 1000 people, furnishing wire forming and weaving machinery to nearly every country in the world, particularly the United States.

★ ★ ★

He is probably best known for the development of the Automatic Chain Link Mesh Loom which fostered an entirely new industry. His latest contribution to the wire industry was the development of a revolutionary new Hexagonal Wire Mesh Loom weaving at hitherto unthought of speed.

Hubbard and American Pulley Join Forces

Hubbard Spool Company, Garrett, Ind., has announced that it has joined forces with the **American Pulley Company,** Philadelphia, Pa.

GREATER FLEXIBILITY IN WIRE STRAIGHTENING AND CUTTING WITH VARIABLE SPEED DRIVE

. . . in a low cost machine

- Select-O-Speed Drive permits selection of infinitely variable feed speeds from 25 to 155 FPM for all types of wire and rod.
- Available with super-sensitive electric trip mechanism.
- High-Speed Five-Die Straightener Arbor, mounted on ball bearings.
- Lewis engineered, simple, rigid, dependable . . . of best materials and workmanship.
- Ideal for manufacturers of stove and refrigerator racks, lamp shades, wire baskets, garment hangers, welding rod and other products where small diameter wire is used.

Lewis 1-C Automatic Wire Straightening and Cutting Machine. 1/16" to 1/8" capacity.

For further information write:

THE LEWIS MACHINE COMPANY

3441 EAST 76TH STREET • CLEVELAND 27, OHIO

For a long time Hubbard's management has been of the opinion that to broaden its field and to better serve customers, its line should be expanded to include large, heavy-duty type steel process and shipping reels. Although the American Pulley Company is best known for its mechanical power-transmission products and its line of materials-handling equipment, they have for many years been factors in the manufacture of pressed steel reels; therefore, joining with them seemed to be a "natural" for Hubbard to accomplish this.

★ ★ ★

It is felt that there will be extensive advantages to be gained from the planned integration of the sales of spools and reels through the Hubbard Spool Company and the additional manufacturing facilities that will become available, together with an enlarged and more diversified engineering force, as well as a combined Research & Development Department. All of this will assist in improving present products, as well as developing new types of spools and reels for the future requirements of the Wire & Cable Industry.

★ ★ ★

The Hubbard Spool Company will operate as a Division of the American Pulley Company. Manufacturing will continue as formerly at Hubbard's Garrett, Indiana, plant and no changes are contemplated in sales or management personnel.

★ ★ ★

Eber J. Hubbard will continue as President and General Manager of Hubbard Spool Division and **R. M. Stout** as General Sales Manager, assisted by **John C. Kerr** and **Bryant W. Gillespie.**

★ ★ ★

Hubbard looks forward as a result of its integration with the American Pulley to being of greater service in the future to their good customers and friends in the Wire & Cable Industry.

Roebling Elects Sales Executive

E. George Hartmann has been elected vice president-sales of **John A. Roebling's Sons Corp.**, it has been announced by **C. R. Tyson,** executive vice president of this C.F.&I. subsidiary.

★ ★ ★

The appointment became effective January 1, 1958. He is located at the corporation's main office in Trenton, N. J. Prior to his appointment, Mr. Hartmann was general product manager of the Wire and Cold Rolled Products Division of the Roebling Corporation. He has had over 37 years' experience in the wire industry.

★ ★ ★

Mr. Hartmann replaces **Ernest C. Low,** who retired on December 31 after 47 years of service. **W. C. Palmer,** previously sales manager of Roebling's Wire and Cold Rolled Products Division, has replaced Mr. Hartmann as general product manager. **F. T. Updike,** formerly chief engineer, has been made sales manager.

Let us help untangle your WIRE problems...

We're old hands at it. If you use manufacturers' wire, you may have a lot to gain by getting in touch with your nearby Sheffield office. Our metallurgists and wire specialists can analyze your wire uses and make recommendations that may speed production, improve products and cut costs for you.

Sheffield's steelmaking and wire drawing facilities enable us to supply the right wire for any set of specifications. We're doing it for manufacturers and fabricators of more than 2000 different products. We'll not only come up with the right wire for you, but we are often able to recommend more economical ordering units.

Finally, there's Sheffield packaging. Our Kone-Pak* gives you in one continuous spool the equivalent of 2 to 40 ordinary coils. Kone-Pak saves handling and machine downtime for loading. With it comes the protection of specially treated wrapping that assures rust-free delivery and storage of your wire.

Just call your nearest Sheffield office.

**Pat. Pending*

SHEFFIELD
ARMCO
Wire Products

Sheffield serves the Midwest, Southwest and Gulf Coast with one of the most diversified lines of finished and semi-finished steel products in the steelmaking industry.

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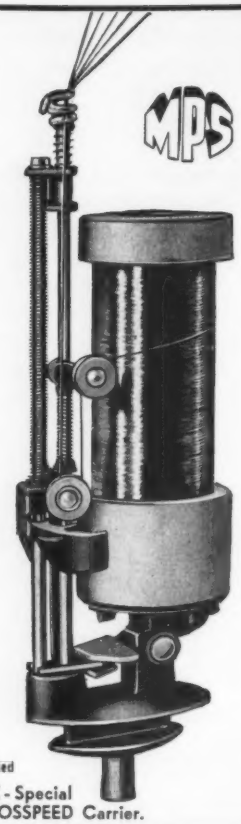

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2 BX - Special
MOSSPEED Carrier.

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FOR BRAIDING
MULTIPLE ENDS OF FINE WIRES

A special design MOSSPEED CARRIER and BOBBIN is supplied for braiding "SHIELDED" WIRE, ETC.

Will braid multiple ends of aluminum, brass, bronze or copper wire, etc.

TWO SHEAVE-WHEELS and SPECIAL-TOP-THREADEYE on carrier, together with new type BOBBIN provides an even wire "let-off" resulting in a high quality and uniform braided shield.

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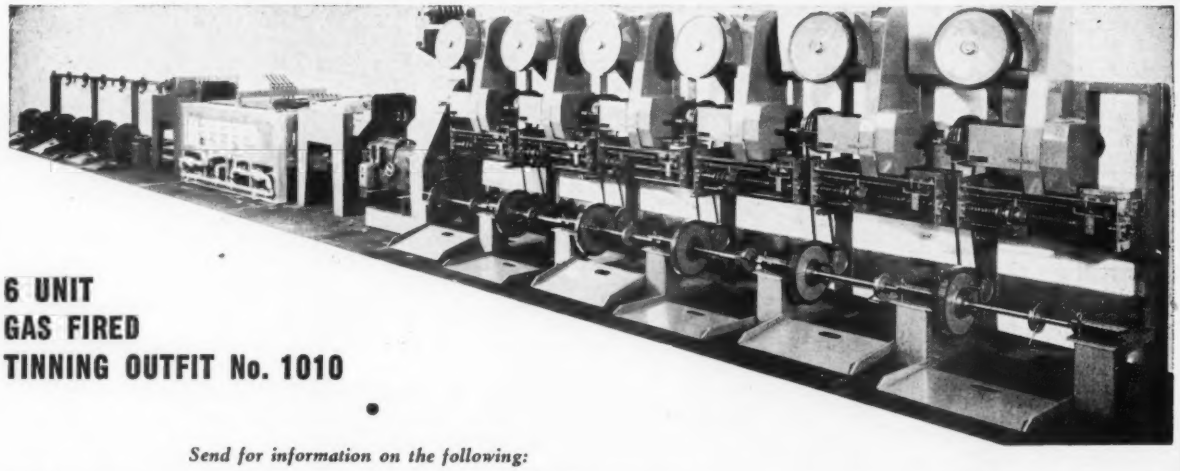

6 UNIT
GAS FIRED
TINNING OUTFIT No. 1010

Send for information on the following:

WIRE ANNEALING, TINNING and GALVANIZING OUTFITS

MULTIPLE or SINGLE UNIT WIRE TAKE-UPS

FINE WIRE DRAWING MACHINES

MAGNET WIRE ENAMELING EQUIPMENT, INCLUDING

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COTTON, GLASS-FIBRE and TAPE COVERING MACHINES

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"American" AIM INSULATING MACHINERY COMPANY

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FAIRHILL AND HUNTINGDON STREETS

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To Handle Wire and Cable Sales in West

J. M. Gerber's appointment as Western Regional Sales Manager for the Wire and Cable Division of **The Electric Auto-Lite Company** has been announced by **D. M. Skirving,** Wire and Cable Division Sales Manager.

★ ★ ★

In his new post, Mr. Gerber will direct the Company's expanding aircraft and industrial wire and cable sales activities in seventeen states west of the Mississippi. Most recently, Mr. Gerber was California District Sales Manager for the Division.

P. C. Borax Advances Three Men

Pacific Coast Borax Company, a division of United States Borax & Chemical Corp., has announced the appointment of three divisional Vice Presidents. These are as follows:

L. L. Fusby, Vice Pres. ..... Production
R. W. Hinchman, Vice Pres. ..... Sales
M. H. Pickard, Vice Pres. ..... Market Res. and Prod. Dev.

★ ★ ★

In announcing these appointments **J. F. Corkhill,** Vice President and General Manager stated that they were made in recognition of the increased duties and responsibilities assigned to the three men, all of whom have had broad experience with the Company over a period of some years.

★ ★ ★

Mr. Hinchman and Mr. Pickard will continue to make their headquarters in New York and Mr. Fusby will continue at Los Angeles.

New Carboloy Production Engineer

Robert A. Slater has been appointed manager of manufacturing engineering in the **Metallurgical Products Department of General Electric Co.** in Detroit.

★ ★ ★

Mr. Slater recently was senior manufacturing engineer in General Electric's Schenectady headquarters. He received a degree in mechanical engineering from Texas Technological College, Lubbock, Texas.

Frank Glader Retires

Frank J. Glader who has served as President of the **Wm. Glader Machine Works** since 1913 retired on January 1, 1958. Mr. Glader completed 64 years of continuous service with the Company founded by his father **William Glader** in 1887.

William F. Glader, grandson of the founder, has been appointed President and **Robert J. Glader,** who represents the fourth generation in the business, is the new Vice President.

Promoted to General Manager

Carl C. Rigsby has been named General Manager of the **Packard Electric Division, General Motors Corp.,** Warren, Ohio. He was previously Factory Manager and succeeds **B. N. MacGregor,** who has retired.

You may never use a wire drawing die this large, but no matter what size dies you're refinishing, you can save money by using NORBIDE Abrasive — rather than costly diamond dust — for ripping or fast stock removal as well as for accurate semi-finishing operations. For details, write for Form 559.

NORTON
BORON CARBIDE

NORTON COMPANY
New Bond Street
Worcester 6, Mass.

Live Better Electrically

The entire electrical industry has been organized to promote the wiring of homes and business buildings and the greater use of electrical equipment.

★ ★ ★

Adequate wiring is basic to an expanded use of electric appliances, as well as electrical machinery.

★ ★ ★

For this nation-wide promotional campaign, which is aimed at home owners, school children, business and industrial executives, practically every branch of the electrical industry is cooperating to awaken the public to a realization of the need for more adequate wiring.

★ ★ ★

Power companies, electrical contractors, wholesalers, electrical dealers, appliance and equipment manufacturers and even a few electric wire and cable concerns are engaging in various forms of advertising, each suited to its particular circumstances and each designed to build business for those who cooperate.

In this line-up of supporters of the movement, but with few exceptions, the manufacturers of electric wire and cable have been noticably slow in getting on the band wagon with active cooperation.

★ ★ ★

This is indeed an extraordinary circumstance, for this branch of the electrical industry stands to be a most important beneficiary. It has been estimated that a 2000 sq. ft. "live better electrically" house, wired to meet modern requirements, would need 203% more wire than the average home of today of the same size, wired to old standards. This wiring affects the entire industry, all the way back to the utility company supplying the power.

★ ★ ★

All phases of this branch of the industry are urged to render full cooperation in the matter of supporting the cooperative efforts that will be essential to the success of the campaign. This should include those who produce building wires, power transmission cables, magnet wires, radio and T.V. wires, appliance cords and cables, resistance wires and all of those other types that will enter into the manufacture of any and all types of equipment that will be given a boost by the promotional plans that are afoot.

★ ★ ★

The stakes are sufficiently high so that no branch of the electrical industry can afford not to do its bit to help bring the campaign to successful fruition.

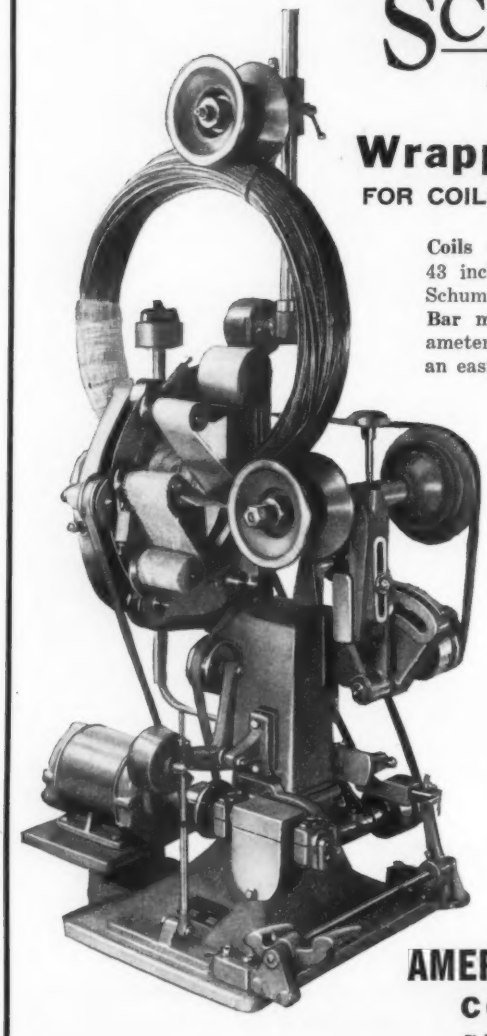
★ ★ ★

The big drive for 1958 gets under way officially throughout the nation with the observance of National Electrical Week in February, which coincides with the birthday of Thomas A. Edison, the father of our modern electrical industry.

New Swaging Machine

The Fenn Manufacturing Co., Newington, Conn., has announced a new improved Model 1F Swaging Machine to replace the former widely used Model 1A. Improve-

SCHUMAG
AACHEN



Wrapping Machine
FOR COILS, BARS AND BUNDLES

Coils with outside diameters up to 43 inches are handled by the basic Schumag WS 2a machine illustrated. **Bar** material up to 6 inches in diameter is handled by the addition of an easily attached auxiliary device.

Outstanding Features

- Coils, bars and bundles automatically wrapped tightly and smoothly.
- Solidly guided open wrapping ring.
- Precision adjustment of wrapping-band tension. Once set, tension remains constant.
- Adjustable wrapping pitch. Special ranges available on order.
- Automatic shut-off of wrapping mechanism, adjustable for any size of coil.

Write for descriptive literature, or send us your wrapping specifications

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ments include an extra heavy, one piece cast frame that provides rigidity, perfect alignment and freedom from vibration, all of which are difficult to maintain in built-up frames constructed of several components.

★ ★ ★

It also features a heavier drive. Motor and electrical parts are mounted within the frame. The Model 1F requires floor space of only 25″ x 20½″ and weighs 625 pounds.

★ ★ ★

For detailed specifications write The Fenn Manufacturing Company, Fenn Road, Newington, Conn.

Technical Bulletin on Wire, Cable and Conduit

"Guide to Representative Wire, Cable and Conduit Manufactured by Rome Cable," a new technical bulletin which describes the general characteristics of and uses for most of the firm's products, is now available from Rome Cable Corp., Rome, N. Y.

★ ★ ★

The bulletin includes information on insulation and sheating materials; bare and weatherproof wires; magnet wires; building wires; service cables; machine tool and control wires; hook-up wires; power cables; portable cords and cables; street lighting cables; instrumentation, station control, supervisory and signal cables; and conduit. Common terms for all Rome Cable trade names and a list of the firm's district sales offices are given.

★ ★ ★

Free copies may be obtained by writing the Technical Bulletin Division for bulletin RCP-100.

Canadian Cable Firm to Build in New Brunswick

Planned ultimately to turn out a full range of electric wire and cable for domestic and export market, the **Western Wire & Cable Company** has completed plans for a new wire-making plant at Lancaster, N. B., and will shortly call for tenders for a factory which will initially employ 35 people.

★ ★ ★

Drawing wire from metal rod of copper and aluminum, the plant will utilize equipment from England, Switzerland, the United States and Canada. Production is expected to start about March, 1958.

★ ★ ★

The company is operating plants at Vancouver, where it started nine years ago, and in Alberta and Saskatchewan.

Named Director of Research

Franz P. Zimmerli, director of research for **Associated Spring Corporation,** an authority on spring metallurgy and automotive springs, retired on January 1, 1958, after more than thirty years of service with Associated Spring.

★ ★ ★

H. Perry Smith, who joined the Corporation as assistant director of research early in 1957, has been appointed to succeed Mr. Zimmerli as director of research.

Another Development ... by Hubbard!

PLYWOOD MARRIES STEEL

FOR BETTER SHOP REELS

RESULTING IN

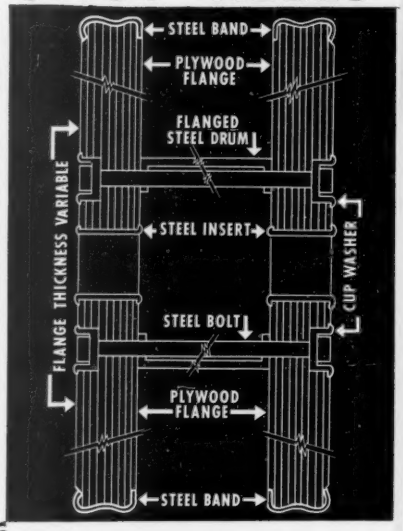
1 GREATER IMPACT STRENGTH

2 LOWER MAINTENANCE COSTS

3 LIGHTER WEIGHT FOR EASIER HANDLING

4 CAN BE SUBMERGED IN WATER

5 WIDE RANGE OF SIZES



LOWER INITIAL COST

FOR DETAILS CONTACT

HUBBARD SPOOL CO.

GARRETT, INDIANA

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of th.s magazine and remitting 50c for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,815,062, MACHINE TO SIMULTANEOUSLY EFFECT A PLURALITY OF BENDS IN A ROD, patented December 3, 1957 by John A. Cook and John A. Cook, Jr., Fairfield, Ala.

Two longitudinally-extending guide members are disposed for later reciprocation of one of them, with alternately spaced anvil supports mounted thereon for longitudinal movement therealong. On the supports are upstanding work engaging anvils and arms pivotally connected to the support units and extending outwardly thereof. There are other work-engaging anvils mounted on the arms and disposed to lie on the other side of a rod (to be bent) from the first-mentioned anvils.

★ ★ ★

No. 2 815,278, MFTHOD AND APPARATUS FOR RECOVERING THE COPPER OF ELECTRICALLY INSULATED COPPER WIRE, patented December 3, 1957 by Richard A. Wilkins, Rome, N. Y., assignor to Revere Copper and Brass Incorporated, Rome, N. Y., a corporation of Maryland.

The wires are formed into a vertically-extending confined columnar-like mass, and heat applied to melt the copper and subject the insulation to reduction without ignition thereof, with the molten copper conducted off.

★ ★ ★

No. 2,815,706, MULTIPLE SKEWER, patented December 10, 1957 by Harold Weinberger, South Orange, New Jersey.

The skewer is constructed of heavy wire or light bar stock. Three claims.

★ ★ ★

No. 2,815,710, COOLING AND DRIVING A MARKING WHEEL FOR FRESHLY COATED WIRE, patented December 10, 1957 by William S. Pearson, Baltimore, Md., assignor to Clifton Conduit Company, Inc., Baltimore, Md., a corporation of Maryland.

A jet of cooling fluid is projected against the marking wheel in the direction of rotation thereof whereby not only to maintain the wheel cool enough to assure sufficient chilling of the tacky wire coating on contact with the marking periphery of the wheel to avoid sticking of the wire coating to the wheel periphery but also to assist in assuring rotary movement of the wheel at the same surface speed as running of the wire for thereby assuring legibility of the markings applied to the wire periphery by the marking means on the wheel periphery.

★ ★ ★

No. 2,815,905, APPARATUS FOR WINDING COILS ON SPOOLS, patented December 10, 1957 by Robert O. Birchler, Cicero, and Oliver M. Nielsen, Chicago, Ill., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

A coil winding arbor for supporting a plurality of headed spools during the simultaneous winding of strands of wire thereon is disclosed and comprises members engageable with the heads of the spools, a device for removably supporting a number of the members and spools in aligned and assembled relation for rotation about an axis concentric with the spools and with the members between the spools, and means on the members adjacent the spools for gripping and frictionally holding portions of the strands.

★ ★ ★

No. 2,816,524, APPARATUS FOR MARKING WIRES AND CABLES AND THE LIKE, patented December 17, 1957 by Geoffrey Norton Ridings, Eccles, Manchester, England, assignor

MEET THE "PLASTISPOOL" FAMILY

LET THEM MOVE INTO YOUR PLANT

— and eliminate your fine wire packaging headaches. **"PLASTISPOOLS"** were designed specifically for you manufacturers of fine wire to rid you of costly production slowdowns caused by wire catching and breaking on nicks, ridges and seams so often found on other spools. **"PLASTISPOOLS"** now do away with out-moded returns, crushing and warping. These rugged, light weight spools may also be obtained in different sizes and in colors for wire coding and product identification. Write or phone us collect now to see how easily these perfectly engineered Boonton **"PLASTISPOOLS"** fit into your plant picture.

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BOONTON MOLDING CO.

BOONTON, NEW JERSEY TELEPHONE DEerfield 4-4400

to British Insulated Callender's Cables Limited, London, England, a British company.

For stripping wire, the inventor provides apparatus comprising a centrally throated bushing consisting of at least two separable segmental parts, a sleeve of soft cellular rubber surrounding and holding said segmental parts together, a sleeve of relatively rigid material surrounding and providing external support for this sleeve of soft cellular rubber, at least one port in the wall of the cellular rubber sleeve, a port in the wall of the supporting sleeve in register with the first port and in register with the ports a radial passage in the wall of the bushing which leads to the interior of the throated portion of the bushing.

★ ★ ★

No. 2,816,594, COIL WINDING MACHINE AND METHOD IN WHICH BOBBIN ASSEMBLY ROTATES SLOWER THAN COILING HEAD ASSEMBLY AND IN A FIXED RATIO, patented December 17, 1957 by Jacob Van Broekhoven, Passaic, N. J., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania.

The method of helically winding an elongated article about a non-rotatable mandrel of an automatic coil winding machine is disclosed and comprises continuously rotating a bobbin assembly and a coiling head assembly during the coiling interval of each cycle of operation in the same direction, and in a fixed ratio of rotation to twist the elongated article during winding to provide a uniform desired length of coil, the bobbin assembly being rotated more than one turn and at a slower rate of rotation than the rate of rotation of the coiling head.

★ ★ ★

No. 2,817,129, HOSE CLAMP, patented December 24, 1957, by Fred T. Roberts and Robert E. Roberts, Wilton, Conn.

The clamp comprises a length of springy wire with ends formed into loops, extending toward each other and providing an inter-engagement for overcoming the springiness sufficiently to lock the clamp in an open position.

★ ★ ★

No. 2,817,130, HOSE CLAMP, patented December 24, 1957 by Fred Thomas Roberts and Robert E. Roberts, Wilton, Conn.

This is a modification of the clamp disclosed in Patent 2,817,129 and also comprises a single length of wire.

★ ★ ★

No. 2,817,948, WIRE STRANDING MACHINE, patented December 31, 1957 by John Cook, Ridgewood, N. J.; John R. Cook and Paul Maxwell Cook, executors of said John Cook, deceased, assignors to Cook Manufacturing Company, Paterson, N. J., a corporation of New Jersey.

The machine includes a flyer and a reel rotated by a motor, with a variable driving connection between the motor and a reel supporting member independent of the flyer to positively control relative rotation of the flyer and reel, and a device for varying the drive during the winding of wire on the reel.

No. 2,818,075, APPARATUS FOR CLEANING METAL STRIP CONTINUOUSLY, patented December 31, 1957 by Ralph Dunlevy, Detroit, Mich., Harold L. Frick, Hamilton, Ohio, and John H. Shoemaker, Detroit, Mich., assignors to Kolene Corporation, Detroit, Mich.

In order to prevent the accumulation of an abrasive carbonate content in the molten alkali metal salts (reactive with carbon dioxide) coated upon a pair of strip guide rollers within the cleaning tank, the inventors mount beneath the surface and within the body of the molten salt bath, gaseous fuel burners providing sufficient heat to maintain the bath in the fused state by combustion of combustible gases therein, and duct means cooperating with the burners for conducting all of the waste carbon dioxide containing combustion gases out of contact with and away from the molten salts and from the area of the apparatus thereby preventing contamination of molten fused salt with carbonates resulting from absorption thereby of carbon dioxide occurring in waste gases.

★ ★ ★

No. 2,818,088, WOVEN FABRIC CONSTRUCTION, patented December 31, 1957 by Daniel E. Houghton, Arlington, Va., assignor to New York Wire Cloth Company, York, Pa., a corporation of Delaware.

Weaving of the warp and weft wires of this insect screening is such that the selvage edges of the fabric resemble the selvage edges of conventional fabric having a continuous weft filament. There is also a pair of warp-like wire stabilizing filaments disposed in the selvage

Photo Courtesy of Bedford Wire & Cable Corp.

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CABLE FILLER

for Savings in a Good-Looking Cable

You save time and money in your cabling operation when you use Plymkraft Cable Filler. Its greater fill capacity, greater uniformity, assure you of a better looking cable. Made to fit your particular standard of manufacturing, Plymkraft is treated to meet various moisture, strength and fungi requirements. Smooth running Plymkraft is also ideal for highspeed cablers where extra strength is a must. Use Plymkraft Cable Filler, your best bet for clean, efficient cabling.

To keep up to date with cable filler developments, it takes only an inquiry for samples of Plymkraft. To find the quality cable filler best-suited for your wire needs, write today to:

PLYMKRAFT DIVISION

PLYMOUTH CORDAGE COMPANY

PLYMOUTH, MASSACHUSETTS

and parallel to other warp filaments, these stabilizing filaments being in side by side abutting relationship to each other and also being respectively oppositely woven relative to said weft filaments and inwardly bent ends thereof, thereby positioning the inwardly bent ends of the weft filaments in woven position within the fabric selvage.

★ ★ ★

No. 2,818,104, SPRINGS AND SPRING ASSEMBLIES, patented December 31, 1957 by Robert Neddermark Carson, Jr., Attenborough, England.

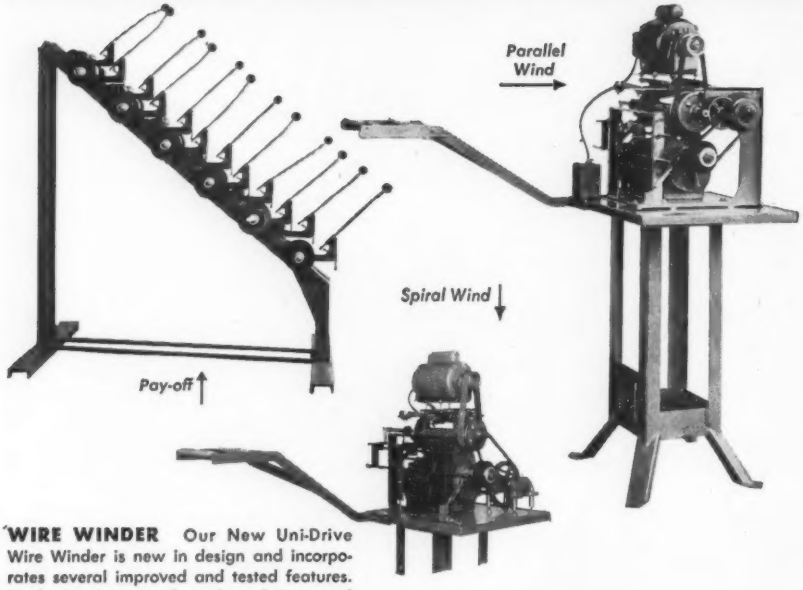
The spring of this assembly comprises a V-shaped connecting structure of corrugated wire, the upper and lower parts of the structure being initially separate at the intermediate apex of the structure, and overlapping biasing elements for joining the arms of the structure and biasing them in an opening direction near the apex.

★ ★ ★

No. 2,818,381, COATING FILAMENTARY MATERIAL, patented December 31, 1957 by Charles P. Smith, Emporium, Pa., assignor to Sylvania Electric Products Inc., a corporation of Mass.

A process of electrophoretically coating filaments with an insulating composition is disclosed comprising the steps of laying the ends of the filaments between two registering strips of electroconductive foil, pressing the foil strips about the filament ends so as to snugly engage the same and immersing the filaments and a portion of the strips in a bath containing an insulating composition and applying an electric potential to the strips and bath.

STANDARD UNI-DRIVE WIRE WINDER



WIRE WINDER Our New Uni-Drive Wire Winder is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel — no over or under-winding. Can also be furnished with a slight spiral pattern for winding exceedingly fine wire. Automatic Stop Motion controls each strand. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors.

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAY-OFF Our Pay-off Attachment consists of a heavy fabricated frame on which Pay-off spools are mounted to cover desired number of ends to be wound. Equipped with spindles, running on self-aligning ball bearings, with size of spindles and adapters to accommodate customers' pay-off spool. Compensating Attachment to control the tension of each individual strand of wire, applying the same tension when spool is full as when empty. Can also be adapted for use with bunching machines.

STANDARD MILL SUPPLY COMPANY
31 ESTEN AVENUE PAWTUCKET, R. I., U. S. A.

ASTM Standards on Copper and Copper Alloys

A new edition of the ASTM standards covering copper and copper alloys, cast and wrought, has been published. Thirty-four of the 128 standards included in the now obsolete December 1955 edition were revised in 1956 and 1957; the revised standards are in the new edition. Also included for the first time are specifications for threadless copper pipe and for copper drainage tube.

★ ★ ★

Products covered include: basic coppers, non-ferrous metals used in the manufacture of copper alloys, copper and copper alloy wrought products including electrical conductors, copper alloy ingots and castings, and copper and copper alloy filler metal. Test methods for these materials accompany the specifications. A 16-page index appears at the back of the book.

★ ★ ★

Sponsored by Committee B-5 on Copper and Copper Alloys, Cast and Wrought, the book is a handy reference for those people in industry dealing with the production, sale or purchase of copper-base metals. Copies may be obtained from ASTM Headquarters, 1916 Race St., Philadelphia 3, Pa., at $6.25 per copy ($7.00 for cloth binding).

Publishes Carbide Technical Manual

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa., announces the publication of a new Carbide Technical Manual. The manufacture and physical properties of tungsten carbide, Firthite grade selection and application, the use of single point tools, and recommended Firthite cutting speeds are featured.

★ ★ ★

Information is given graphically wherever practical, and pictures and drawings are included throughout. Copies are available upon request.

ALUMINUM INGOT AND MILL PRODUCTS AND MAGNESIUM MILL PRODUCTS: SEPTEMBER 1957

(Shipments and receipts are in thousands of pounds)

Item	Number of companies reporting shipments	September 1957			August 1957* net shipments	September 1956 net shipments
		Gross[1] shipments	Receipts[2]	Net[3] shipments		
ALUMINUM PIG AND INGOT, TOTAL	88	157,449	70,589	86,860	75,095	90,277
ALUMINUM MILL PRODUCTS, TOTAL	163	232,845	17,281	215,564	223,786	217,425
Sheet and plate, non-heat-treatable	27	89,173	13,426	75,747	81,977	77,723
Sheet and plate, heat-treatable	4	(D)	(D)	17,804	18,005	25,172
Foil, including foil in lamination	15	(D)	(D)	17,720	17,814	14,179
Rolled structural shapes, rod and bar	7	14,558	3,042	11,516	7,426	9,750
Wire, bare	18	4,531	218	4,313	3,522	4,381
ACSR and aluminum cable, bare	11	(D)	(D)	13,317	16,020	12,949
Conductor wire and cable, insulated or covered	15	(D)	(D)	4,105	3,950	5,079
Extruded shapes, soft alloys	97	55,078	489	54,589	57,059	48,499
Extruded shapes, hard alloys	8	4,224	...	4,224	4,292	5,772
Drawn tube, soft alloys	12	3,624	...	3,624	3,859	3,980
Drawn tube, hard alloys						
Welded tube, non-heat-treatable	7	984	...	984	[4]1,666	1,211
Powder and paste						
Atomized and grained powder	5	743	...	743	721	923
Flaked powder	5	373	...	373	448	548
Paste	5	1,686	...	1,686	2,055	1,482
Forgings	17	4,819	...	4,819	4,972	5,777
MAGNESIUM MILL PRODUCTS, TOTAL	10	(D)	(D)	1,501	1,540	2,031

*Revised.

D Withheld to avoid disclosing figures of individual companies. These figures are included, however, in the appropriate total.

[1]Gross shipments of mill products represent total shipments by producers to customers, including other producers, and shipments by producers to their own fabricating departments which manufacture products beyond the level of mill shapes. Ingot gross shipments include shipments by importers.

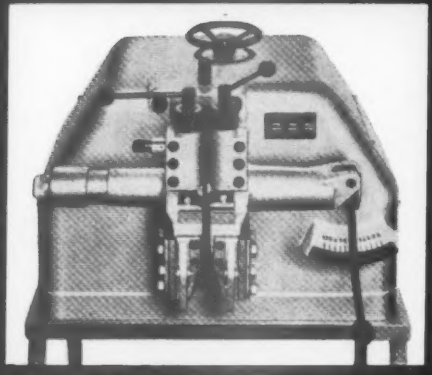
[2]For mill products, represents receipts from domestic producers only. In addition to receipts from domestic producers, 313,000 pounds of mill shapes were received through imports. For ingot, receipts from imports are included.

[3]For mill products, derived by subtracting the sum of producer's domestic receipts of each mill shape from the industry's gross shipments of that shape. Ingot data derived by subtracting all receipts from shipments reported.

[4]Includes small amount of heat-treatable welded tube.

SCHLATTER

the world's leading wire welding machines



Schlatter welders, provided with automatic annealing-device, will give perfect welds on high carbon steel and patented wires.

Wire butt welder type M

for steel, brass, aluminium and copper.

Welding range:

Steel . . . . . 0,157" — 0,512" ø

Copper . . . . . 0,157" — 0,374" ø

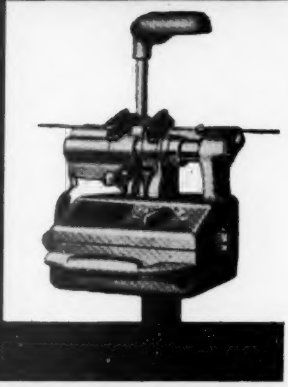
wire welder type E

Four different models for butt welding of steel, copper, brass and aluminium.

Welding range:

Steel . . . . 0,039" — 0,315"

Copper . . . . 0,039" — 0,236"



H. A. SCHLATTER LTD ZOLLIKON/ZÜRICH (SWITZERLAND)

Manufacturers of electric welding machines

Sole Representative: Paul Reicher Machinery & Equipment, P.O. Box 127, Willowdale, Ont., Canada

AMERICAN IRON AND STEEL INSTITUTE
150 EAST FORTY-SECOND STREET, NEW YORK 17, N. Y.

AIS 10

Total Number of Companies Included 128

SEPTEMBER - 1957
Month

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING CARBON, ALLOY AND STAINLESS
(Net Tons)

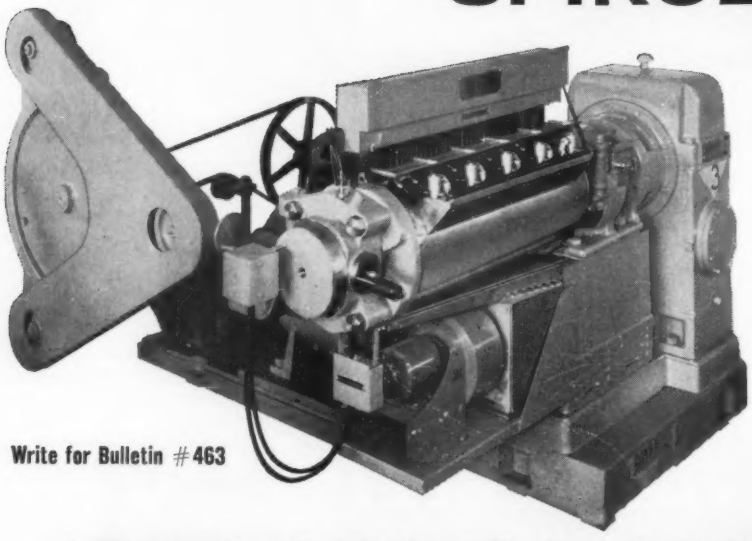
Covering Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or for Resale)

Steel Products	Item	Current Month 1957 Carbon	Alloy	Stainless	Total	Percent of Total Shipments	Prior Year (1956) Percent of Total Shipments	Year to Date 1957 Carbon	Alloy	Stainless	Total	Percent of Total Shipments	Prior Year (1956) Percent of Total Shipments
Ingots and Steel Castings	1A	17,512	12,773	1,418	31,703	0.5	1.1	207,881	148,205	18,680	374,766	0.6	0.9
Blooms, slabs, billets, sheet bars	1B	103,920	30,112	1,397	135,429	2.2	2.5	1,587,430	335,805	16,556	1,939,791	3.1	2.7
Tube rounds	1C	687	438	-	1,125	-	-	* 50,061	2,869	-	52,930	0.1	-
Skelp	2	15,012	-	-	15,012	0.2	0.2	121,407	-	-	121,407	0.2	0.2
Wire rods	3	15,467	1,624	264	17,355	0.3	1.4	* 123,634	13,278	3,893	* 140,805	0.2	1.3
Total Semi-Finished		212,598	44,947	3,079	260,624	4.2	5.2	* 2,690,413	500,157	39,129	* 3,229,699	5.2	5.1
Bars—Hot rolled (incl. light shapes)	14	425,069	116,155	3,509	544,733	8.8	10.7	* 4,777,180	1,135,466	43,980	* 5,956,626	9.5	10.5
Bars—Reinforcing	15	182,168	-	-	182,168	3.0	3.3	1,881,859	336	-	* 1,882,195	3.0	2.9
Bars—Cold finished	16	81,219	16,314	3,852	101,385	1.6	1.6	847,303	181,845	45,366	1,030,314	1.7	2.2
Tool steel	17	911	7,004	-	7,915	0.1	0.1	10,030	67,481	-	77,511	0.1	0.2
Total Bars and Tool Steel		689,307	139,473	7,361	836,201	13.5	15.9	* 7,466,372	1,370,928	89,346	* 8,946,646	14.3	15.8
Wire—Drawn	23	195,073	2,304	2,279	199,656	3.2	3.7	* 1,972,794	32,455	21,603	* 2,026,912	3.2	3.7
Wire—Nails & staples	24	35,478	-	-	35,478	0.6	0.8	364,144	-	3	364,147	0.6	0.7
Wire—Barbed & twisted	25	2,857	-	-	2,857	0.1	0.1	51,695	-	1	51,696	0.1	0.1
Wire—Woven wire fence	26	10,723	-	-	10,723	0.2	0.3	175,253	-	-	175,253	0.3	0.4
Wire—Bale ties	27	1,623	-	-	1,623	-	-	44,263	-	-	44,263	0.1	0.1
Total Wire & Wire Products		245,754	2,304	2,279	250,337	4.1	4.9	* 2,608,349	32,455	21,607	* 2,662,471	4.1	5.0
Black plate	28	42,266	-	-	42,266	0.7	1.0	483,190	-	-	483,190	0.8	0.9
Tin & terne plate—hot dipped	29	36,963	-	-	36,963	0.6	1.0	* 576,779	-	-	* 576,779	0.9	1.2
Tin plate—Electrolytic	30	338,018	-	-	338,018	5.5	5.6	3,911,666	-	-	3,911,666	6.2	5.9
Total Tin Mill Products		417,349	-	-	417,349	6.8	7.6	* 4,973,663	-	-	* 4,973,663	7.9	8.0
Sheets—Hot rolled	31	550,264	27,161	1,506	578,951	9.4	10.0	5,790,012	233,010	19,669	6,042,691	9.6	10.4
Sheets—Cold rolled	32	966,604	4,201	8,135	978,940	15.9	14.8	8,651,525	33,044	113,007	8,797,576	14.1	16.1
Sheets—Galvanized	33	183,947	5	-	183,952	3.0	3.6	1,829,840	176	-	1,830,016	2.9	3.6
Sheets—All other coated	34	17,406	-	-	17,406	0.3	0.2	* 150,235	-	-	* 150,235	0.2	0.3
Electrical sheets & strip	36	5,383	41,271	-	46,654	0.7	1.0	70,007	421,251	-	491,258	0.8	1.0
Strip—Hot rolled	37	96,331	2,031	922	101,284	1.6	2.1	1,043,302	23,440	5,894	1,072,636	1.7	2.2
Strip—Cold rolled	38	86,375	1,365	5,011	103,551	1.7	1.6	740,610	14,254	145,253	900,117	1.4	1.9
Total Sheets and Strip		1,908,330	76,034	26,374	2,010,738	32.6	33.3	*16,281,531	725,181	283,823	* 19,290,535	30.8	35.5
Total Shipments (1957)		5,764,611	363,130	43,727	6,171,674	100.0	xxx	*56,415,281	3,063,092	490,195	* 62,589,328	100.0	xxx
Total — Prior Year (1956)		6,550,202	446,503	59,323	7,058,028	xxx	100.0	56,200,042	4,069,092	454,492	60,624,966	xxx	100.0

*Revised.

ROYLE

SPIROD® for Rubber or Plastic Wire Insulating



Write for Bulletin #463

These all electric extruders with radiant heat and high velocity evaporative cooling are designed to process either plastic or rubber compounds. The result of more than three quarters of a century of experience — Royle pioneered the extrusion process in 1880— in the design and construction of extruding machines time tested features have been built into Spirod to assure dependability.

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England
James Day (Machinery) Ltd.
Hyde Park 2430 - 0456

Home Office
V. M. Hovey J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter Co.
BLackstone 3-9222

Downey, Cal.
H. M. Royal, Inc.
TOpaz 1-0371

Tokyo, Japan
Okura Trading Co., Ltd.
(56) 2130 - 2149

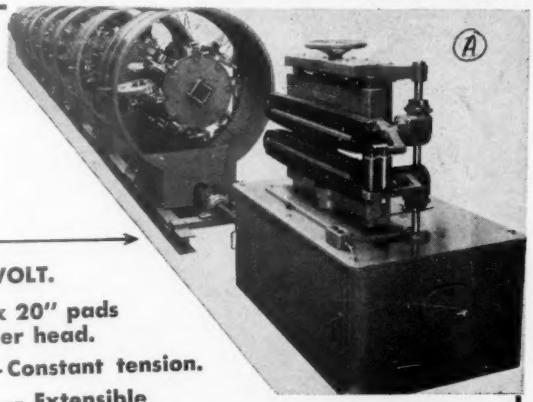
COPPER - Refined metals consumed in mill products 1/ in 1956 and 1957, by months, and stocks of refined copper at end of period, gross weight in short tons

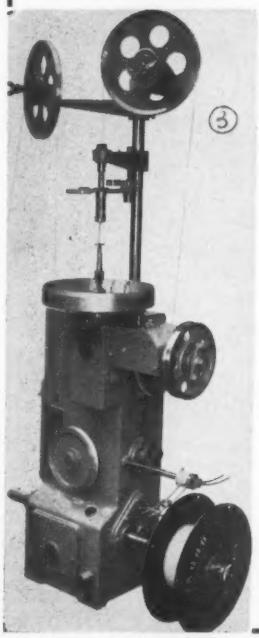
Period	Consumption						Stocks of refined copper	
	Wire mills:	Brass mills						
	Refined copper 2/	Refined copper 2/	Refined lead	Primary pig tin	Refined nickel	Slab zinc	Wire mills	Brass mills
1956 (final)	864,585	611,098	2,742	1,144	4,453	111,651	40,188	51,040
1957:								
January	72,973	51,499	221	71	399	9,900	36,435	42,005
February	64,389	44,424	211	89	348	8,343	31,098	36,933
March	68,633	42,263	214	74	422	8,110	42,145	38,726
April	71,652	47,344	199	83	506	8,638	37,367	38,739
May	68,252	48,901	197	90	372	8,659	42,560	40,028
June	63,080	41,617	216	73	400	7,896	43,649	40,119
July	44,702	33,737	159	64	272	5,687	49,779	40,663
August	66,778	45,083	210	92	323	8,877	51,444	39,075
September	61,781	43,311	171	77	(3)	8,795	54,123	37,619

1/ Data cover operations of 18 wire mills and 59 brass mills.
2/ Detailed information on consumption of refined copper is published in the Monthly Copper Report.
3/ Not available.

NEW...

IN PAPER LAPPING





FOR TELEPHONE
— High speed paper lapping.
— 3,000 r.p.m.
— Movable drum.
— Automatic stop.
— 12" pad.
— Electric counter.
— Central lubrication.

FOR HI. VOLT.
— 8 x 20" pads per head.
— Constant tension.
— Extensible pad centre.
— Individually braked.
— Variable die.
— Caterpillar haul-off.
— P.I.V. drive.
— Automatic stop.

POURTIER MACHINES
153, rue Général Gallieni
ROMAINVILLE (Seine) FRANCE

New High-Speed Wire Weaving Machine Announced

The new, high-speed Warner & Swasey-Sulzer Wire Weaving Machine, designed to produce quality insect screening up to 50 inches in width at four to six times the rate of conventional equipment, is announced by **The Warner & Swasey Co.**, 5701 Carnegie Ave., Cleveland 3, Ohio.

★ ★ ★

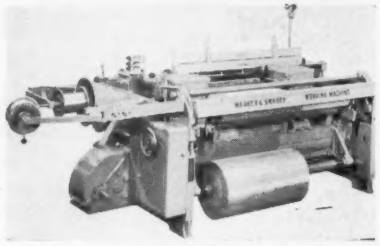
Based upon the operating principles incorporated in the company's line of precision looms for the textile field, the new wire weaving machine has been perfected with the cooperation of leading engineers in the wire weaving industry.

★ ★ ★

Eliminating completely the conventional bar loom type bobbin system, the new Wire Weaving Machine uses instead a series of lightweight, one ounce steel shuttles which draw from a continuous supply of filler wire. Each shuttle, with filler wire attached, is propelled through a tunnel of guides on the machine by a simple and rugged torsion rod mechanism. The filler wire thread, upon reaching the opposite edge of the insect screen cloth, is cut and its end then tucked back into the edge, forming the selvage. The machine operates at an amazing 240 picks per minute.

★ ★ ★

Speed, however, is not the only advantage of the new machine. The filler, for example, is supplied from a standard mill bulk spool which holds 15 pounds or more of wire. This gives a running time of two to three hours, depending upon cloth width. Duplicate feed



arms enable the operator to prepare the next spool before the one being used runs out. The use of these big filler packages means the machine has to be stopped very infrequently, and there are no small bobbins to rewind. The result is high efficiency and considerable savings in time and expense.

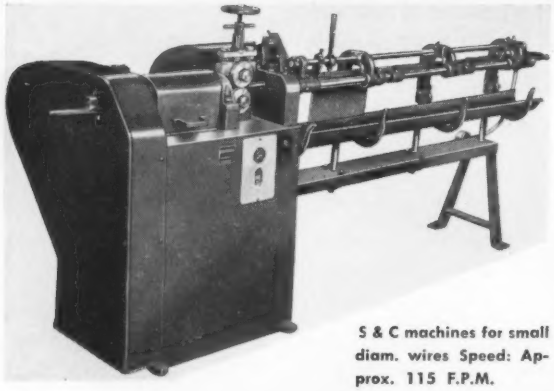
★ ★ ★

According to Warner & Swasey, operation of the new wire weaving machine in the production of insect screening becomes practically an automated process. The quality of the screening produced, coupled with the machine's unchallenged operating speed, appear to represent a major technological breakthrough in the wire weaving industry.

New Material Reduces Wear of Measuring Wheels

Extremely close measuring wheel tolerances, pin-point accuracy and a relatively small abrasion factor represent the main elements essential to measuring wire and cable. Attaining and maintaining these goals has been a major

New! Improved! Fast!
WELLS STRAIGHTENER & CUTTER



S & C machines for small diam. wires Speed: Approx. 115 F.P.M.

This completely redesigned line combines maximum efficiency with that rugged dependability, for which WELLS S&C machines have become justly famous.

Built in several sizes to handle 2 to 18 ga. basic and high carbon wire.

FEATURES

The guide bar of these new machines can be supplied for any cut lengths • The rotary steel flier runs on ball bearings for smoothness and long life • Cut-off is actuated by a solenoid for extreme accuracy of cut lengths • A two point cam construction provides a quick and positive return of the cut-off knife, eliminating the need for a clutch and dog • A counter is standard equipment.

A COMPLETE RANGE OF S & C MACHINES
IS MADE BY WELLS FOR ALL SIZES OF WIRE.
SEND FOR CATALOG ON THE COMPLETE LINE.

Frank L. Wells Company

Builders of Fine Wire Working Machinery

5821 FIFTH AVENUE • KENOSHA, WISCONSIN

problem to most manufacturers of measuring wheels. Even hard surfaced wheels last only about 6 months, to say nothing of the inertia of steel wheels.

★ ★ ★

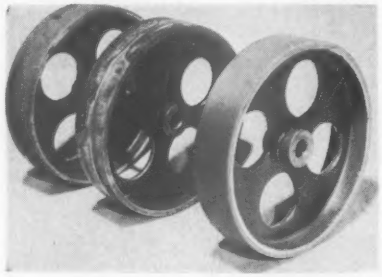
To cope with this situation, a leading manufacturer of wire measuring machinery, **The Davis-Standard Division of Franklin Research Corp.,** Mystic, Conn., began an intensive search for a material that could be bonded securely to the aluminum wheels and which would outwear the hardened steel spray. After much investigation, they selected Disogrin, a urethane elastomer, because of its high abrasion resistance, superior resilience and excellent bonding qualities. The product is made by **Disogren Industries, Inc.,** Jamaica 30, N. Y.

★ ★ ★

Casting Disogrin on the wheels and machining them to extremely close tolerances, Disogrin Industries gave Davis-Standard in mid-1956 the first set of wheels for trial, which were immediately subjected to test by a leading manufacturer of wire and cable in the New England area. After six months of use, the Disogrin wheels showed no appreciable wear, though operated at a rate of 2,000 feet per minute. Davis-Standard reports that now, after a full year of operation under identical conditions, these wheels show no wear and still are in use.

★ ★ ★

These results and similar findings culminating from tests conducted at other wire and cable plants, resulted in Davis-Standard's decision to make Disogrin measuring wheels not only the replacement wheel for worn steel wheels, but as standard equipment on all new wire measuring machinery manufactured by them.



Wheel at left is a new steel hardsurfaced wheel. Center: same wheel after 6 month's use. Disogren wheel at right, used for same period, shows no grooving.

★ ★ ★

Within a year after its introduction, the company reports that approximately 150 Disogrin wheels on 75 wire measuring machines presently are in use in the wire and cable industry.

N.E.W. To Be Observed in February

National Electrical Week is scheduled for February 9-15, 1958.

★ ★ ★

It is an all-industry event, sponsored or endorsed by the 26 leading trade associations in the electrical industry, representing electrical manufacturers, power suppliers, distributors, dealers, contractors, inspectors, engineers, wiremen, and electrical leagues.

LOW COST precision wire plating

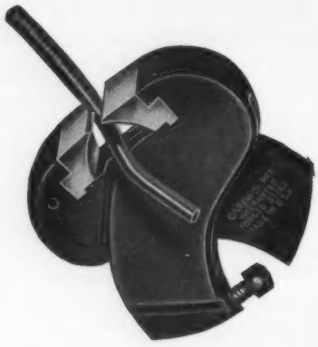
MAINTAIN UNIFORM COATINGS AT HIGH SPEEDS!

CONTINUOUS ELECTROPLATING EQUIPMENT

This low cost equipment performs with ease and efficiency that mean real savings. Preset quality control insures perfection without depending on operators' skill. No toxic fumes, clean operation at low temperature, elimination of work hardening during processing and many other features are the result of experience and sound engineering that go into the design of all Universal equipment.

We furnish complete installation . . .
For further information write to:

UNIVERSAL INDUSTRIAL EQUIPMENT CO.
SECAUCUS, NEW JERSEY SOLE AGENT IN CANADA: E. V. LARSON CO., LTD., TORONTO, CANADA



Above You See the Business End of a

CAREW

CUTTING NIPPER

FEATURING—

- Replaceable tool steel jaws. Hardened all the way through—not just carburized.
- Box joint construction.
- Forged handles of high tensile steel.

We represent these to be the best wire cutting tools made anywhere.

Ask your mill supply dealer for them!

Made by

M. W. ROBINSON CO., Inc.

ROCKFALL
CONNECTICUT

The annual observance, always held during the week that includes February 11, birthday of Thomas Alva Edison, highlights the benefits to mankind of all our great electrical pioneers.

★ ★ ★

The principal objectives of National Electrical Week are to focus attention on the contributions of electricity to our economy and way of life and promote adequate wiring in buildings of all kinds.

★ ★ ★

It is carried out as an "umbrella activity"—a beginning of the year springboard for all the various programs and educational or promotional objectives of the industry—by state and local N.E.W. committees and by individual companies, industry groups or representatives.

★ ★ ★

Further information about National Electrical Week may be obtained from, National Electrical Week Committee, 290 Madison Ave., New York 17, N. Y.

Announces Wire and Cable Machinery Division

Collins Bros. Machine Co., a leading manufacturer of textile equipment, has established a Wire and Cable Machinery Division at its plant at 647 Roosevelt Ave., Pawtucket, R. I.

★ ★ ★

The Company is currently in production in concentric taping machines and multiple timing take-ups. It also offers its engineering and manufacturing facilities for special machinery to order.

New Torsion Spring Machine Announced

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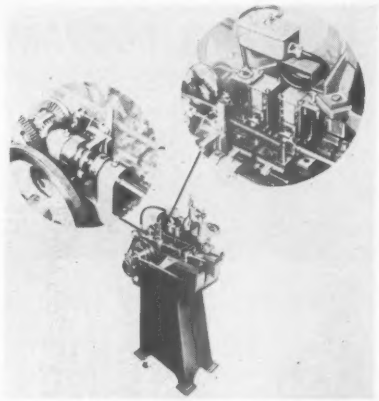
cam shaft cycling arrangement making possible a much greater amount of forming work. The cam shaft is driven from the clutch shaft through a single revolution clutch operating from a cam mounted on the crank gear shaft. The clutch is tripped at each end of the coiling cycle, causing a one-half revolution of the cam shaft at approximately seven times normal speed, increasing the angular time for forming from approximately 20 degrees to 140 degrees. As a result, more intricate forming may be accomplished with less supplementary equipment, and in many cases the need for secondary operations is eliminated. Tool setups may be easily and quickly tested under actual power conditions without going through the entire coiling cycle simply by hand-tripping the clutch.



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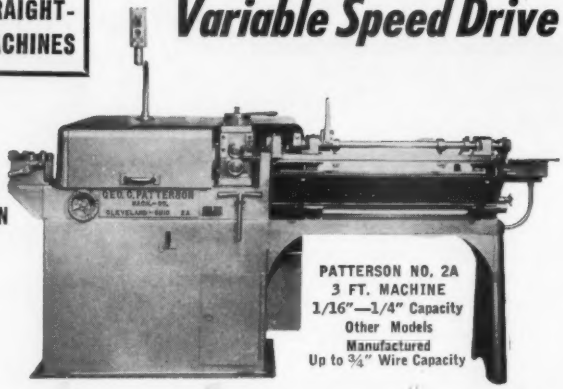

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Ridge Elected Officer by Roebling

William C. Ridge has been elected vice president—production of **John A. Roebling's Sons Corp.,** it was announced on January 14 by **C. R. Tyson,** executive vice president. The appointment became effective on January 1st.

★ ★ ★

The Roebling firm, a subsidiary of **The Colorado Fuel and Iron Corp.,** is a nationally-known manufacturer of wire and wire products.

★ ★ ★

Mr. Ridge, a graduate of M.I.T., has been with Roebling for 15 years. Prior to his appointment, he was works manager of the corporation and before that manufacturing manager of the Electrical Wire Division.

Fatigue of EC Aluminum Wire

(*Continued from page* 186)

lar rotating-buckling tests. Specially designed machines were used at these laboratories, but the basic operation is similar to that of the Krouse equipment. Test speeds of 5000-6000 rpm were used, and fatigue failure occurred at the midpoint of the test specimens.

Results and Discussion

In the flexure tests, specimens were tested at stresses of 8,600 to 17,000 psi. Summary S/N curves for the three lots of wire are given in Figure 1, and the fatigue strength of the three lots are very similar. Lot CM 2898 was drawn from redraw rod produced by Reynolds' slit sheet process.

★ ★ ★

In the rotating-buckling tests at Pacific Testing Laboratories, the calculated stresses were 11,500 to 28,000 psi. Summary curves are shown in Figure 2. Again the data show very similar properties for the three lots of wire under investigation. For stresses above 20,000 psi, plastic deformation is highly probable, and the data are not con-

sidered significant for this evaluation.

★ ★ ★

Summary curves of the data obtained at the other two laboratories are shown in Figures 3 and 4. These curves also show that no significant differences in fatigue properties have been obtained. The magnitudes of the stresses differ among the three laboratories, but such differences are rather common in fatigue testing. No particular significance can be attached to these differences; the essential factor is that each testing station has independently verified the conclusion that the fatigue characteristics of EC wire drawn from slit sheet redraw rod are equivalent to those of wires drawn from conventional redraw rod.

★ ★ ★

Some of these differences in stress values can be accounted for by the several values of elastic modulus used by each laboratory. If the data are adjusted to reflect a uniform modulus of 10,000,000 psi for all specimens, the data are in better numerical agreement.

★ ★ ★

Flexure and rotating-buckling tests do not duplicate the type of vibration stresses encountered in electrical transmission lines. In these applications a variable dynamic stress created by wind and other conditions is superimposed on a large static stress. For a comparative study of material behavior, wire fatigue testing of the type used for this report has particularly desirable properties, namely, inexpensive specimens and small scatter of data. Thus a relatively large number of specimens have been tested over a wide range of stress values, and statistical analysis of the data has been simplified.

★ ★ ★

The data clearly show that the Reynolds process for manufacturing electrical conductor alloy wire results in wire having essentially equal fatigue properties to wire produced by the conventional methods of other producers.

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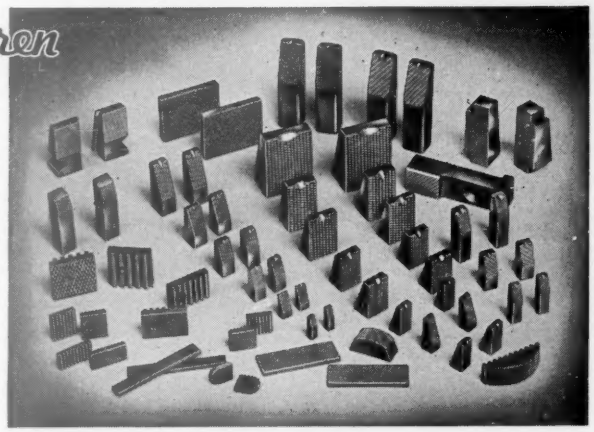

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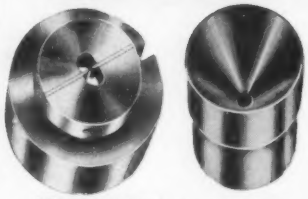

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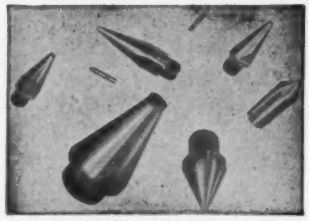

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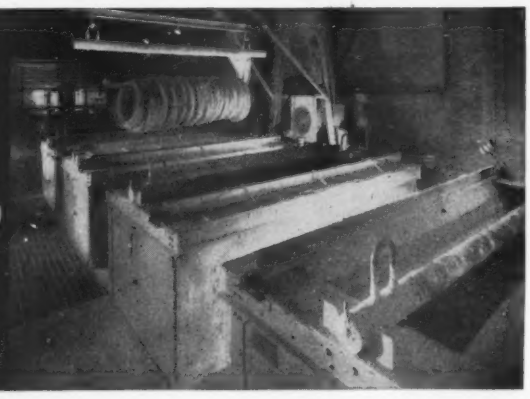

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The Effect of Stock Temperature on the Physical Properties of Polyethylene Coatings for Wire

(*Continued from page* 184)

tests were carried out on samples which had been aged for 7 days in an air oven set at 98° C. The results showed that samples obtained with the stock temperature during extrusion above 410° F retained at least 75% of their original tensile properties. Below this stock temperature elongation values showed a marked deterioration. (See fig. 3.)

★ ★ ★

Unaccelerated aging tests have been in progress on polythene insulation extruded over No. 14 A.W.G. wire for one year. Samples obtained over a wide range of stock temperatures have been tested at three-month intervals. Those samples obtained at a stock temperature below 400° F have shown a marked decrease in elongation—retaining only 16% of their initial values. Samples obtained at stock temperatures above 430° F have retained 85% of their original elongation values. For all samples under test, the ultimate strengths have not fallen off appreciably from initial values. The samples have been aged at room temperature and no attempt had been made to shield them from ultra-violet light. The polythene used for the insulation in this series of tests was a melt index 2.0 compound containing 2.5% channel black and 0.2% Agerite White anti-oxidant. The coating thickness was 0.031 inches.

★ ★ ★

It was determined that crosshead insert design can play a large part in enabling a polythene coating to meet the tensile requirements of the weather-proof wire insulation specifications. An insert which allowed a 10% drawdown gave results that showed promise. Coupled with the over size orifice, a combination of two entry angles produced a jacket which had tensile properties that were sufficiently high at a stock temperature of 380° F to pass the specifications. (See fig. 4.) To date, no field trials have been possible util-

izing this type of insert so that no additional data is available.

★ ★ ★

The improvement in tensile properties obtained with the above insert over the properties obtained with an insert allowing for no drawdown is compared graphically in fig. 5.

★ ★ ★

Inserts which allowed for a compound drawdown of 25% were also evaluated and although good tensile properties were achieved, high stock temperatures were required in order to obtain a satisfactory coating appearance. It was felt that there was little advantage to using this type of insert over the more common type which is presently widely employed.

★ ★ ★

It was determined that stock temperature requirements for maintenance of a smooth, shiny finish increased as the wire speed was increased. The tensile properties of the insulation also improved with the additional amount of heat required and no difficulties were encountered in meeting the tensile requirements of the weather-proof wire insulation specifications when running at high speeds.

★ ★ ★

Some preliminary results obtained on the tensile properties of polythene insulation extruded on No. 14 A.W.G. solid aluminum conductor are shown in figure 6. While sufficient data is not yet available to permit the plotting of curves, the effect of stock temperature on both ultimate tensile and elongation of the insulation appears to be markedly greater than was observed when copper conductor was used. Although admittedly limited in scope these preliminary results on aluminum wire are felt sufficiently striking to merit mention at this time.

★ ★ ★

The heat conductivity of aluminum is only about half that of copper. Hence one possible explanation for the marked differences observed in tensile values at high stock temperature would be that

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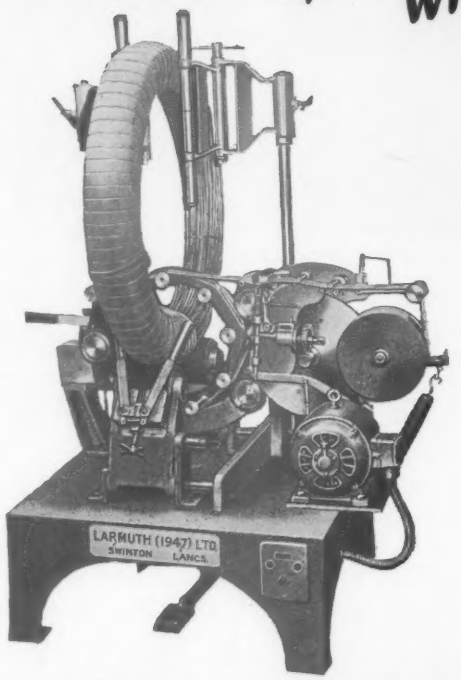

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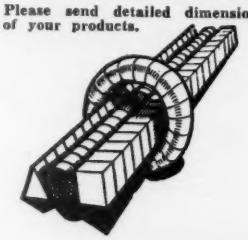

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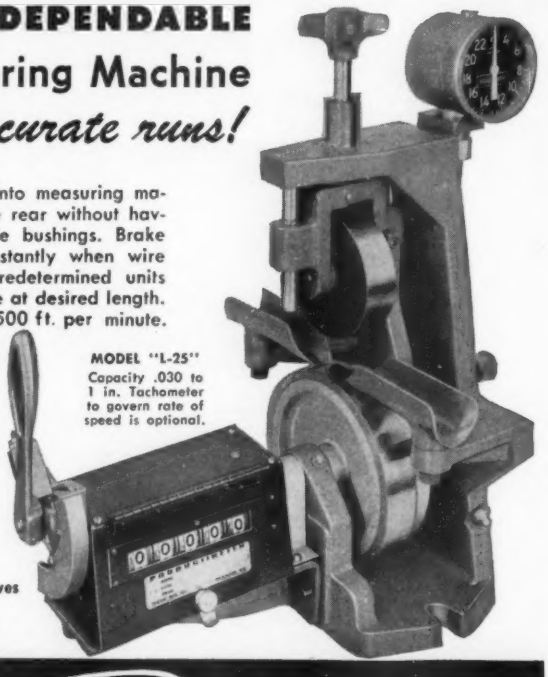

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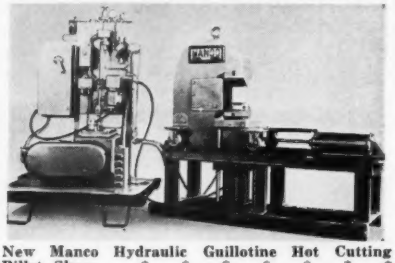
the insulation is not chilled so quickly when aluminum wire is used. The possibility that the extremely high preliminary results obtained on aluminum wire at high stock temperatures could be approached on copper by preheating the wire to a sufficiently high level appears to merit investigation.

New Hydraulic Guillotine Hot Billet Shear

Stainless and medium carbon steel billets at temperature ranges from 1,600°F to 1,200°F can be hydraulically sheared on a new Manco Guillotine Model MC-270 Billet Shear. The unit which develops 70 tons thrust at 5,000 p.s.i. has a capacity for 2½" x 3½" flat or rolled shape or approximately 8.75 square inch shear area. It takes only 9 seconds to make the cut and about 15 seconds for the complete cutting cycle.



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★ ★ ★

The shearing unit and traverse frame weigh 1,650 lbs. The power unit weighs approximately 400 pounds. For complete information, write **Manco Mfg. Co.**, Bradley, Ill.

"Preformed" Wire Products

(*Continued from page* 178)

Summary

It is necessary to weigh each of the desired properties discussed in an attempt to arrive at the optimum design, subsequent to many tests of the wire—both as-drawn and after the forming operation.

★ ★ ★

The problem of selecting an entirely suitable non-ferrous alloy to be utilized in manufacturing splices for copper conductors is one which has been problematic for quite some time. It is a known fact that, for more conventional uses, electrical and thermal conductivities of copper alloys are of secondary importance (if significant at all) since these two properties are intentionally sacrificed while other characteristics are being improved. It has been virtually impossible to obtain from the suppliers all of the information needed to properly evaluate the various alloys for use in Preformed products. It is for this reason that an extensive testing program is required.

★ ★ ★

Figure 8 indicates the results of an actual series of tests where various copper alloys of different wire diameters were formed into Preformed splices, and subsequently applied to several sizes of copper conductor.

★ ★ ★

Curves 1, 2, and 3 for the three copper alloys under consideration, reflect the ultimate strength, electrical conductivity, and the endurance limit of the various alloys versus the copper alloy wire gage employed in the test. For every copper conductor diameter, the proper design of Preformed splices using a particular gage of copper alloy as determined from the graph, gave a splice with a minimum of 100% relative splice-to-conductor strength and electrical conductivity. At the same time, stress level in the splice fell below the endurance limit of the wire during repeated tensile stressing from zero to an arbitrarily estab-

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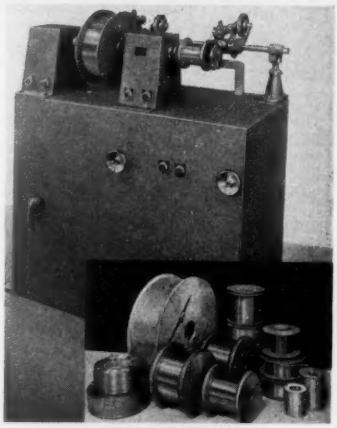

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lished maximum tensile load. The maximum load was chosen to exceed any extreme conductor tensions thought possible in actual field usage. The "desired" curve reflects the ease of application and the number of helically-formed wires required per splice for design purposes. This curve is an ideal situation which cannot be realized in practice—the actual curve, although not yet determined, will approximate the "desired" one.

★ ★ ★

Of special interest is Alloy 1. Except for its poor endurance limit in actual tests, it would fall below or on the desired curve. However, because it repeatedly failed before the copper conductor, a fundamental test limitation, the wire size had to be increased to lower the test stresses below its endurance limit.

Conclusion

The growth in the use of Preformed products for armoring, splicing and dead-ending alone has been very rapid during the past nine years. With many millions of these items in service, with new applications being developed at a very rapid rate, and with several hundred thousand being shipped monthly from three plants to customers throughout the nation, there is a constant demand for more information concerning their unique properties. Perhaps the most important of these characteristics are those related to dependability and inherent safety features.

★ ★ ★

Dependability and safety are a direct function of engineering design, manufacturing skills, and equally important, the physical and electrical properties of the ferrous and non-ferrous wire employed.

★ ★ ★

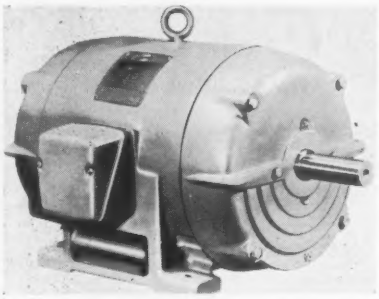
Therefore, not only has a new wire product been created, but also a demand for new combinations of properties within many ferrous and nonferrous alloys has also been established.

New Type Motor Announced

The Louis Allis Co. recently announced production of industry's first synchronous induction motor built in the same NEMA frame size as a standard motor of equal horsepower.

★ ★ ★

Called the Syncro-Spede, this motor accelerates as an induction motor but runs at exact synchronous speed without permanent magnets or D.C. excitation involving collector rings and brushes, wound rotating fields, etc. It is the most



compact AC motor available for synchronous applications and offers the highest power factor and efficiency. It is suitable for use on many applications requiring constant speed with varying load. The Syncro-Spede can be used for constant speed drives in such industries as machine tool, synthetic fiber, plastic, paper, wire-drawing, glass making and printing. Because of its size it can provide precise frequency systems in small generator ratings.

★ ★ ★

The Syncro-Spede is manufactured in ratings from 1 to 100 HP in any enclosure type, can be foot or flange-mounted and is designed for horizontal or vertical mounting with mechanical modifications to meet specific applications.

★ ★ ★

For complete information, request Bulletin No. 1900 from the Louis Allis Co., Dept. P, 427 E. Stewart St., Milwaukee 1, Wis.

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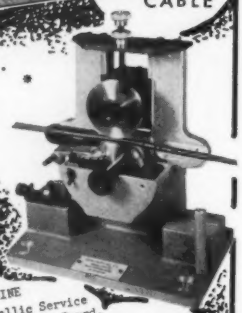

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To: PRODUCTION SUPT.
Subject: TYPE A M-GEM MARKING MACHINE
Marks on Non-Metallic Service Entrance Cables, Twin or Round.
Perfect definition of print, no clogging of type.
No 'Down-time' caused by cleaning of unnecessary rolls.
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This looks like just what we need. Follow up and contact Gem Gravure Co.
J. L. M.

GEM GRAVURE CO.
Telephone: ROCKLAND Triangle 7-0456
West Hanover Massachusetts U. S. A.

New Developments in Hi-Fax Coverings for Wire and Cable

(*Continued from page* 175)

signed for low density polyethylene on wires of 18 AWG or smaller, rates 90-100% of that expected with low density polyethylene have been obtained. Somewhat lower rates have been experienced using larger wires and cables. Undoubtedly, better production rates would be possible with equipment designed specifically for Hi-fax, and studies of screw and die design are in progress.

★ ★ ★

The major reason for interest in high density polyethylene wire and cable coverings is its improved toughness and abrasion resistance combined with its electrical properties which are similar to low density polyethylene. Applications where the properties of 1600 Hi-fax can be used to advantage include primary insulation on telephone toll and exchange cables, rural distribution wires, and military field wire. Outside of the communication field, it is performing very satisfactorily as a covering for power tree wire.

★ ★ ★

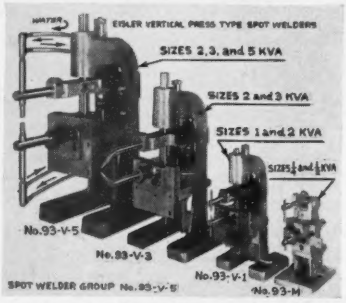
Applications such as cable sheaths, where the ultimate in stress-crack resistance is required, require use of 1800 type Hi-fax. Although this is a higher molecular weight resin than the 1600 type, it has similar physical and electrical properties, but has a substantially higher level of stress-crack and heat-shock resistance. The higher molecular weight resin will withstand more than 1,000 hours' exposure without failure in the Bell Laboratories stress-cracking test. Therefore, in stress-crack resistance, it is equivalent to the low melt index, low density polyethylene now used for sheaths.

★ ★ ★

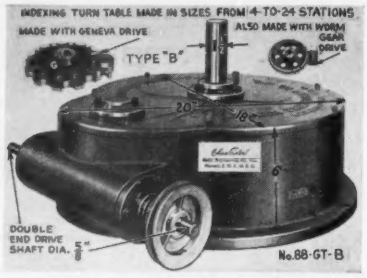
It is frequently true that one property is often improved at the expense of another. Because of the very high molecular weight we have found lower production rates with the 1800 type Hi-fax compared to the 1600 type using conventionally designed equipment.

Eisler Makes The Largest Selection of Small Spot, Wire, Butt, Seam and Foil Welders. Send for Cat. #93-57

A WELDER FOR EVERY PURPOSE



Eisler Indexing Turntables over 100 different types Geneva Gears-Cams made to your specifications. Write for catalog.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Available in two sizes:
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Send us sample of metal to be cut and we will advise proper type of jaws required. HKP®
WRITE FOR FREE PORTER CUTTER CATALOG
H. K. PORTER, INC. Somerville 43, Mass.

Nevertheless, we have reason to believe, on the basis of development work under way, that these rates would be improved.

★ ★ ★

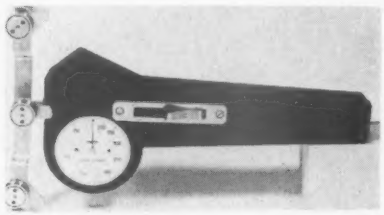
We hope that this discussion today will help you to better assess the utility of high density polyethylenes designed specifically for wire and cable applications. By proper resin design it is possible to minimize problems such as stress and heat cracking often associated with these resins.

Tension Meter for Wire

The R. Y. Ferner Co., 110 Pleasant St., Malden, Mass., has concluded arrangements to sell the Schmidt group of Tensionmeters in this country. These meters are made in a range of tension capacities of from 3 grams to 1500 kilograms.

★ ★ ★

Although similar in appearance to conventional tension measuring meters, the Schmidt meters are advanced in design and possess unusual mechanical perfection for long life and accuracy.



★ ★ ★

Schmidt meters are made in portable types, as illustrated, or for permanent mounting. Tension readings are delicate and critical, as required for wire for the electrical and electronic industries. Demonstrations will be arranged upon request.

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THE WIRE ASSOCIATION
Send for booklet describing its activities and a membership application card.
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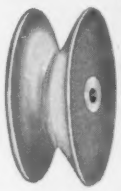
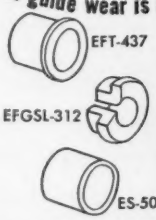


PU-1

If guide wear is a problem in your mill . . .



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Effect of 475°C Heat Treatment on Cold Worked 18/8 Stainless Steel Wire

(*Continued from page* 173)

most 8; for Br, approx. 40; and for coercive force it was in the neighborhood of 33, the latter value being somewhat dubious. This means that for commercial application it is important to study what effect precipitation can have upon the final properties of the material. If corrosion resistance is not necessarily desired and if some below specification stainless steel is obtained, it might not be necessary to scrap this material or reprocess it but merely give it the proper heat treatment to bring its properties into range of acceptability. It should be pointed out, however, that with increasing carbon content, the apparent brittleness of the heat treated material increases while corrosion resistance decreases, quite drastically.

★ ★ ★

As an illustration of this, heat treated wire being run in a recording unit can readily snap when the turntable stops suddenly; this with relatively high carbon contents, namely, in the order of 10 to 12 points. However, when the carbon content is reduced below 8 points, phenomenon is almost never encountered. Thus, not only can below specification material potentially be salvaged, but in turn it is possible to hand pick various lots of stainless steel prior to fabrication such that the required final properties can be obtained.

Acknowledgment

The author should like to express his thanks to the W. B. Driver Company for its kind permission in allowing the publication of this data.

References

1. S. Storchheim, "Permanent Magnetic Properties in 18-8 Stainless Steel Obtained by Cold Working," Iron Age Vol. 171, pp. 140-2, Feb. 12, 1952.
2. S. Storchheim, "How Heat Treatment Affects Properties of Cold Worked 18-8 Wire", Iron Age Vol. 172, pp. 112-4, Oct. 1, 1953.

A Modern Rod and Merchant Mill

(*Continued from page* 170)

We needed such a layout, we have it and are going to run it for a long time.

APPENDIX

A general summary covering the design, and construction of Atlantic Steel Company's rod and merchant mill installed during 1956.

Building Design: Rust Engineering Co.
General Contractor: Rust Engineering Co.
Heating Furnace: Rust Furnace Co.
Mill and Mill Accessories: Morgan Construction Co.
Electrical Equipment: General Electric Co.
Electrical Engineering: General Electric, Construction Engineering Div.
Electrical Construction: Allegheny Industrial Electrical Co., Inc.
Overhead Cranes: Whiting Corp.
Lubrication, Oil: Dravo Corp.
Lubrication, Grease: Farval Corp.
Hydraulic Fluid: Denison Engineering Co.
Recirculating Water System
Centrifugal Pumps: De Laval Steam Turbine Co.
Turbine Pumps: Johnson Pump Co.
Cooling Tower: Sante Fe Tank and Tower Co.
Motors: Westinghouse Electric Corp.
Elevated Tank: Chicago Bridge and Iron Co.
Compressed Air: Fuller Company
Communication System: Modern Sound Co.
Ventilation System: Buffalo Forge Co., American Air Filter Co.
Pulpit Cooling: Larco, Inc.
Hook Conveyor, coiled rods: Link Belt Co.
Straddle Buggy: Ross Carrier Div., Clark Equipment Co.
Fork Lift Truck: Ross Carrier Div., Clark Equipment Co.

New Rubber Insulating Plant

Hatfield Wire and Cable Co., a division of the **Continental Copper and Steel Industries, Inc.**, has purchased a 62-acre site at Linden, N. J. for a 300,000 sq. ft. building to house its rubber insulating plant to be erected on W. Blancke St.

★ ★ ★

Hatfield then will draw all copper and aluminum in its Union (N. J.) plant and insulate with plastic in Hillside or rubber in Linden. The company employs about 700 workers in the Hillside plant, which is to be modernized.

MUSIC WIRE and SPECIAL WIRES
Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3437"
45 sizes Bright Tinned, .003" to .125"
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Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
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Frost Steel Expands to Make Welded Wire Fabric

Frost Steel and Wire Co. Ltd., Hamilton Ontario, has spent $1.5 millions to expand its No. 3 plant on Lottridge Street for the manufacture of welded wire reinforcing fabrics.

★ ★ ★

The project, started in 1954, has added 100,000 square feet of production area to the plant. The first loom was installed in 1955 and a second unit has just been completed and placed in operation.

★ ★ ★

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Each of these looms, as large as any on the continent, can produce 10,000 tons of welded fabric per year, enough to reinforce a two-lane concrete highway from Hamilton to the West Coast. Take-ups will hold 2-ton rolls of fabric and an intricate network of 12 overhead cranes are used to handle the material in and out of the plant.

Wire Rope Plant Purchased

Frederik B. Paulsen, President of **The Paulsen-Webber Cordage Corp.,** New York, has announced the purchase of the plant and assets of the **Sunbury Wire Rope Manufacturing Co.,** Sunbury, Pa., a move that will make the company a major producer of wire rope. The unit will be conducted hereafter under the Paulsen-Webber Company name.

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TESTING EQUIPMENT
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SCOTT TESTERS INC. 55 BLACKSTONE ST. PROVIDENCE 1, R.I.

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Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Company, Harrison, N. J.
Rome Soap Mfg. Co., Rome, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.

MACHINERY—Bobbin Winders
Cedar West Tool Company, Inc., New York, N. Y.

MACHINERY—Braiding
New England Butt Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corporation, New York, N. Y.

MACHINERY—Chain Making
Nilson, A. H. Machine Co., Shelton, Conn.
Pan American Supply Co., The, New York, N. Y.

MACHINERY—Closing Rope
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling & Rewinding Steel Strip
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Herborn, Maschinenfabrik, Herborn, Germany
Morgardshammers Mek Verkstads A. B., Morgardshammer, Sweden.
National Mach'y Exch (Used), New York
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Pan American Supply Co., The, New York, N. Y.
Patterson Machine, Geo. C., Co., Cleveland, Ohio

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Company, Worcester, Mass.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Descaling Rod, Dry
Herborn, Maschinenfabrik, Herborn, Germany

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Metallurgical Products Dept. of General Electric Co., Detroit
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven, Company, Detroit, Mich.

MACHINERY—Extruding
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming Wire
Nilson, A. H. Machine Co., Shelton, Conn.

MACHINERY—Galvanizing Wire
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Gang Slitting
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Mfg. Co., Wallingford, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Hydraulic
Manco Mfg. Co., Bradley, Illinois

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Beard Machine Co., York, Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia
Cook Mfg. Co., The, Paterson, N. J.
Michigan Oven Company, Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Cedar West Tool Company, Inc., New York, N. Y.

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg Co., Milwaukee, Wis.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Godderidge Ste., Houilles (Seine-et-Oise), France

MACHINERY—Plating
Hodge Bros. Machine Shop, Ossining, N. Y.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York,
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Polishing Asbestos Wire
Beard Machine Co., York, Pa.

MACHINERY—Printing on Electric Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M. Co., Inc., Boylston, Mass.

MACHINERY—Re-Spooling
Colbourne Machine Company, Winsted, Conn.
Emory Company, Robert J., Newark, N. J.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Industrial Winding Machinery Co., New York, N. Y.
National Mach'y Exch. (Used), New York N. Y.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

MACHINERY—Rod Mill
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Company, Cleveland, Ohio
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Scrubbing, Steel Strip
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Metal
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Splicing (Strip)
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Pan American Supply Co., The, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Staple
Nilson, A. H. Machine Co., Shelton, Conn.
Pan American Supply Co., The, New York, N. Y.

MACHINERY—Straightening & Cutting
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Pan American Supply Co., The, New York, N. Y.
Patterson Machine, Geo. C., Co., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Straightening (Strip Leveling)
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Stranding
Godderidge Ste., Houilles, (Seine-et-Oise), France
Haskell-Dawes Machine Co., Philadelphia, Pa.
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
American Insulating Mach'y Co., Phila., Pa.
Colbourne Machine Company, Winsted, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Kraft, J. A., Maschinenfabrik, OLPE/Westf. Germany
Litzler, C. A., Co., Inc., Cleveland, Ohio
Pourtier Pere et Fils, Romainville (Seine) France
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Federal Mfg. Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Godderidge Ste., Houilles (Seine-et-Oise), France
Syncro Machine Co., Perth Amboy, N. J.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—Welded Wire Mesh
Manco Mfg. Co., Bradley, Illinois
National Electric Welding Machines Co., Bay City, Michigan
Schlatter, H. A., Ltd., Zurich, Switzerland

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Federal Manufacturing Company, Wallingford, Conn.
Industrial Winding Machinery Co., New York, N. Y.
Kraft, J. A., Maschinenfabrik, OLPE/Westf., Germany
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
Cook Manufacturing Co., The, Paterson, N. J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Federal Mfg. Co., Wallingford, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Morgan Construction Co., Worcester, Mass.
Morgardshammers Mek Verkstads AB, Morgardshammer, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Pan American Supply Co., The, New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Forming
National Mach'y Exch. (Used), New York, N. Y.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Nilson, A. H. Machine Co., Shelton, Conn.
Pan American Supply Co., The, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Larmuth (1947) Ltd., Swinton, England

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MOTORS—Electric, A.C. — D.C.
The Louis Allis Company, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Company, Winsted, Conn.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio
Litzler, C. A., Co., Inc., Cleveland, Ohio

PAILS—Packaging (See Drums—Wire Packaging)

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
National Waterproof Papers, Inc., Beverly, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
National Waterproof Papers, Inc., Beverly, N. J.

PAPER—Insulating
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PATENT—ATTORNEYS—
Rommel, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Monsanto Chemical Company, Plastics Division, St. Louis, Mo.

PLASTICS COMPOUNDING—Custom
Plandex Corporation, Downingtown, Pa.

PLASTICS—for Wire Insulation
Bakelite Company Div. of Union Carbon & Carbide Corporation, New York, N. Y.
duPont de Nemours Co., (Inc.), E. I., Polychemical Dept., Wilmington, Delaware
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plandex Corporation, Downingtown, Pa.
Shawinigan Resins Corporation, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, New York, N. Y.

PRINTING WHEELS—for Electric Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gillies, Duncan M. Co., Inc. Boylston, Mass.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Evans, George, Corp., Moline, Ill.
Hubbard Spool Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Steel, for Rope and Cable
Evans, George, Corp., Moline, Ill.

REELS—Strip Steel
Steel Equipment Company, Cleveland, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Boonton Molding Company, Boonton, N. J.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Nilson, A. H. Machine Co., Shelton, Conn.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Co., Phosphor Bronze Div., Seymour, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SATURATION SYSTEMS—
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

SHEARS—Wire, Rod, Billet
Manco Mfg. Co., Bradley, Illinois

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—Plastic
Boonton Molding Company, Boonton, N. J.
Hubbard Spool Company, Garrett, Indiana
Standard Mill Supply, Co., Pawtucket, R. I

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STOCK STORAGE SYSTEMS
Jarke Manufacturing Co., Chicago, Illinois

STRAIGHTENERS—Portable Rod
Manco Mfg. Co., Bradley, Illinois

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TABLES—Press Feeding
Jarke Manufacturing Co., Chicago, Illinois

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TESTERS—INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Adjustable Speed Drives)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Hodge Bros. Machine Shop, Ossining, N. Y.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Alkanex Wire Enamel Dept., Schenectady, N. Y.
Shawinigan Resins Corporation, Springfield, Mass.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila, Pa.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
Micro Products Co., Chicago, Ill.
National Electric Welding Machines Co., Bay City, Michigan
Schlatter, H. A., Ltd., Zurich, Switzerland
Strecker, August, K.G., Limburg/Lahn, W. Germany

WHEELS—for Printing on Electric Wire
Gem Gravure Company, West Hanover, Mass.

WIRE—Aluminum
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio
National Standard Company, Niles, Mich.
Scovill Mfg. Co., Waterbury, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Ball
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brass and Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Company, Phosphor Bronze Div., Seymour, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—For Electrical Conductors
United Wire & Supply Corporation, Providence, R. I.

WIRE—Flat, Fine
Montgomery Co., The, Windsor Locks, Conn.
National Standard Company, Niles, Mich.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
United Wire & Supply Corporation, Providence, R. I.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
National Standard Company, Niles, Mich.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Manufacturers
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark N. J.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Company, Phosphor Bronze Div., Seymour, Conn.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Metalizing
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
National Standard Company, Niles, Mich.
Worcester Wire Works Div., National-Standard Company, Worcester, Mass.

WIRE—Needle
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Seymour Mfg. Co., Phosphor Bronze Div., Seymour, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Oil Tempered
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Special Shapes
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Roebling's John A., Sons Corp., Trenton, N. J.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside—Alloy Metal Division, Riverside, N. J.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Division, Armco Steel Corporation, Kansas City, Mo.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WOOD—for Guide, Rolls, Bushings, Wear Parts, etc.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

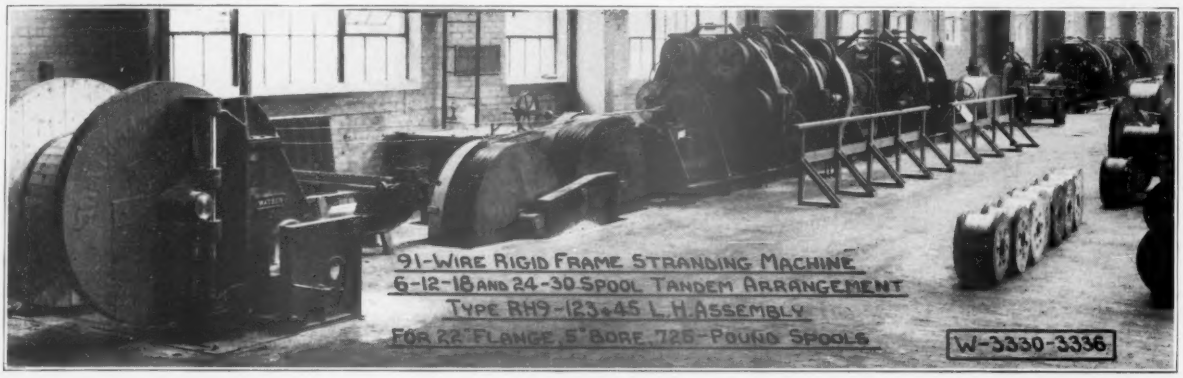
ESTABLISHED 1845

PATERSON 16, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

WATSON

SHOWN HERE THROUGH THE COURTESY OF THE CANADIAN GENERAL ELECTRIC COMPANY, LIMITED, ARE TWO EXAMPLES OF THE MANY COMPLETE MACHINES BUILT BY US. DUE TO THE EMPLOYMENT OF OUR EASILY COORDINATED STANDARD MACHINE UNITS AND SUBASSEMBLIES, SUCH MACHINES PERMIT ALTERATIONS AND ADDITIONS LATER WITHOUT DISTURBANCE OR PROLONGED SHUTDOWN OF THE ORIGINAL MACHINE.


91-WIRE RIGID FRAME STRANDING MACHINE
6-12-18 AND 24-30 SPOOL TANDEM ARRANGEMENT
TYPE RH9-123&45 L.H. ASSEMBLY
FOR 22" FLANGE, 5" BORE, 725-POUND SPOOLS
W-3330-3336

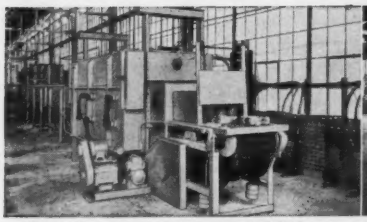
91 WIRE STRANDER RH9-123&45. Arranged for TANDEM OPERATION. Permits single-pass 91-wire concentric layer stranding—or—both machine sections, each with its own capstan and takeup, can be operated independent of each other. Maximum flexibility and repeat passes produce any desired construction. Best suited for soft copper or wire of similar ductility. Much higher production and lower machine cost as compared with planetary machines. All heads are reversible and disconnectable. Heads are of anti-friction bearing and steel construction. Automatic layhead and spool latch stops on each head. Open construction and overhung spool mount reduce loading and threading time to an absolute minimum. "Tilted" Capstan sections prevent side-scuffing and the double wheel design is capable of the heaviest pulls and suitable for compack stranding. Fully motorized Takeups and automatic Traverses. Machine overall length is 142 feet.

6-INCH PARKWAY MACHINE. An ideal machine arrangement for the insulating and steel tape armoring of underground power cable. The machine shown mounts units in the following order:

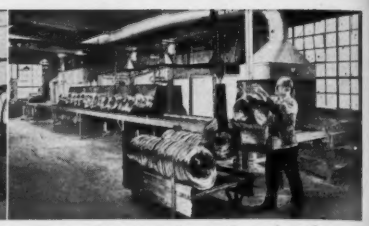
Hydraulic Lift Letoff 84"
Electric Compound Tank
48-Cop Juter
Electric Compound Tank
48-Cop Juter
Electric Compound Tank
Steel Taper 28" D.E.
Electric Compound Tank
48-Cop Juter
Electric Compound Tank
48-Cop Juter
Electric Compound Tank
Motorized Wet Chalker
Capstan mounted 20-H.P. Drive
Single Tapered 80" Capstan
10-Ton Shaftless 96" Takeup

Machine overall length is 120 feet.

2-58



EF belt conveyor furnace bright annealing coiled alloy steel and non-ferrous wire.

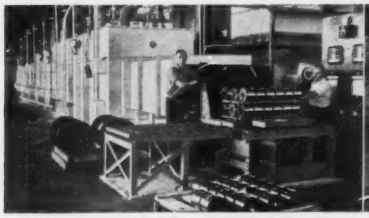


EF continuous roller rail pusher furnace, bright anneals large reels and coils of wire.

designed

engineered

and



This furnace bright anneals wire on reels, spools, and coiled. Capacity 4000 lbs. per hr.

Stainless steel wire is bright annealed continuously in these EF multiple tube furnaces.

Specially Built

to meet the WIRE INDUSTRY'S requirements

Charging end of EF special atmosphere bulkhead pusher furnace; bright anneals copper and copperweld wire and clean anneals brass wire. Capacity 4000 lbs. per hr.

• We build production furnaces for heat processing all kinds of wire, rod, or other products — in any shape or form.

Years of practical experience in designing and building successful heat treating equipment for the wire industry enable us to furnish the best type of equipment for any purpose — and to produce the results required.

Shown here are 8 more production installations we made in prominent wire plants. We receive many repeat orders.

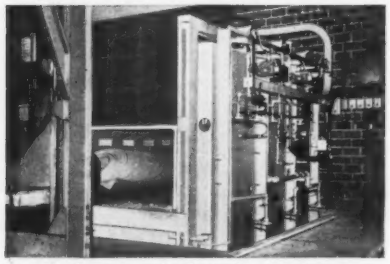
Submit your production furnace problems to experienced EF engineers — it pays.

THE ELECTRIC FURNACE CO.

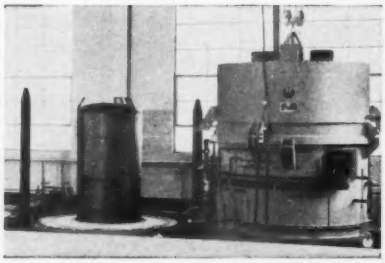
GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS PRODUCT OR PRODUCTION

Salem - Ohio

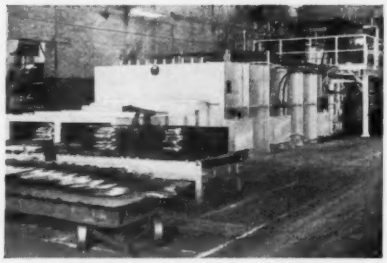
Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada



EF direct gas fired, single end, forced circulation hearth type annealing furnace with gantry crane for handling large coils of cupro nickel wire and brass rod.



EF direct gas fired bell type furnace with retorts and 4 forced circulation bases, used for bright annealing both ferrous and non-ferrous flat coiled wire.



EF special atmosphere continuous bright annealing furnace in which the wire is conveyed through the various zones on two parallel rows of bulkhead type trays.